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State of Rhode Island and Providence Plantations.

TWENTIETH ANNUAL REPORT

OF THE

State Board of Agriculture,

MADE TO THE

GENERAL ASSEMBLY

AT ITS

JANUARY SESSION, 1905.

PROVIDENCE:
E. L. FREEMAN & SONS, STATE PRINTERS.
1905

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REPORT.

To the Honorable the General Assembly of the State of Rhode Island:

In compliance with Section 7, Chapter 99, of the General Laws, I have the honor to submit herewith the ANNUAL REPORT OF THE RHODE ISLAND STATE BOARD OF AGRICULTURE for the year ended December 31, 1904.

JOHN G. CLARKE, SECRETARY.

January 30, 1905.

RHODE
STATE OF
ISLAND
HOPE

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PHILIP A. MONEY.

Philip A. Money, of Exeter, was born in that town, April 28, 1852. He was educated in the public schools of his native town. Is a member of the Washington County Agricultural Society, is one of its vice-presidents and its chief marshal. Was senator, 1882–83, and representative, 1883–85. Was commissioner of town farm for three years, road commissioner five years, assessor of taxes and auctioneer. Has been cattle commissioner for Washington county since 1901.

MEMBERS OF THE STATE BOARD OF AGRICULTURE.

Ex-officio.

George H. Utter, Governor.
Frederick Jackson, Lieutenant-Governor.
Charles P. Bennett, Secretary of State.

APPOINTED BY THE GOVERNOR.

(Pursuant to Chapter 99, of the General Laws.)

Obadiah Brown, of Providence....................Term expires March, 1905.
William Williams, of Bristol....................Term expires March, 1905.
C. C. Wordwell, of Little Compton.............Term expires February, 1906.

APPOINTED BY AGRICULTURAL SOCIETIES.

By the Washington County Agricultural Society.

Philip A. Money, of Exeter.....................Term expires March, 1905.

By the Rhode Island College of Agriculture and Mechanic Arts, and Agricultural Experiment Station.

Thomas G. Mathewson, of East Greenwich.......Term expires February, 1906.

By the Rhode Island State Grange.

I. L. Sherman, of Portsmouth....................Term expires March, 1905.

By the Newport County Agricultural Society.

E. R. Anthony, of Portsmouth....................Term expires March, 1905.

SECRETARY OF THE BOARD.

John G. Clarke, of Washington.

EXECUTIVE COMMITTEE.

Obadiah Brown, of Providence, **I. L. Sherman** of South Portsmouth.
William Williams, of Bristol.

CATTLE COMMISSIONERS.

William Williams, of Bristol	for Bristol County.
John E. Whipple, of Coventry	for Kent County.
George Coggeshall, of Newport	for Newport County.
Henry S. Turner, of Providence	for Providence County.
Tristam D. Babcock, of Westerly	for Washington County.
Philip A. Money, of Exeter	for Washington County.

VETERINARIAN.

John S. Pollard, D. V. S., of Providence.

OFFICE AND LIBRARY.

State House, Room 129.

LEGISLATIVE COMMITTEES ON AGRICULTURE.

Of the Senate.

John H. Edwards, **Job Manchester**, **James A. Northup**,
Herbert A. Gates, **Darwin Holley**.

Of the House.

Charles H. Ward, **George J. Andrews**, **Clarence D. Wood**,
Martin B. Birmingham, **John E. O'Neill**.

REPORT OF THE SECRETARY.

At the annual meeting of the Board, held in June, the following officers and commissioners were elected for one year:

Secretary.—John G. Clarke, of West Kingston.

Executive Committee.—Obadiah Brown, of Providence; Isaac L. Sherman, of Portsmouth; William Williams, of Bristol.

Veterinarian.—John S. Pollard, of Providence.

Cattle Commissioner for Bristol County.—William Williams, of Bristol.

Cattle Commissioner for Kent County.—John E. Whipple, of Coventry.

Cattle Commissioner for Newport County.—George Coggeshall, of Newport.

Cattle Commissioner for Providence County.—Henry S. Turner, of Providence.

Cattle Commissioner for Washington County.—T. D. Babcock, of Westerly.

Cattle Commissioner for Washington County.—Philip A. Money, of Exeter.

At a meeting of the Board held January 12th, 1904, the committee appointed at the meeting held July 15th, 1903, to draft an amendment to our live stock law and to draft a nursery inspector law reported, and their reports were accepted. The laws as drafted by them were amended at a meeting of the Board held February 9th, 1904, and were then presented to the legislature, with a request for passage. After being amended by the legislature both laws were passed in the form in which they appear in another part of this report.

At the meeting held February 9th, the matter of the damage being done to our shade trees by the Gypsy moth was discussed and referred to the executive committee with power to act, which resulted in a bill being presented to the legislature, asking for an appropriation to exterminate this pest. This bill did not pass.

TUBERCULOSIS.

Following this report will be found the reports of the cattle commissioners of the several counties; also the report of the veterinarian.

The bill was introduced in the legislature by request of this Board provided for a more rigid inspection of all cattle coming into this State from other States. At a public hearing before the house committee on agriculture there was such strong opposition to this section of the bill that it was stricken out by the committee. The section provided for a tuberculin test of all cattle coming into the State. This was a very important part of the bill and should have been passed, for there are hundreds of cattle brought into the State each year, and in spite of the physical examination, which is of no value until the disease is far advanced, many cattle are sure to be brought in that have the disease and sooner or later have to be killed. We feel that a more rigid examination is necessary if we are to ever overcome this dreaded disease.

This bill also provided for the disinfection of all barns and stables where the disease had been found. This disinfection will help, in a way, to lessen the disease, but we still believe that the farmers should be more particular regarding the sanitary conditions of the barns. Better sanitary conditions, more light, and better ventilation would do much to lessen the disease.

We find the disease is still on the increase, partly due, perhaps, to the increase in number of cattle kept. During the month of October more cattle were killed than during any one month in the history of the Board.

GLANDERS.

We find glanders on the increase in this State, 93 horses having been killed this year; and we feel that more stringent laws of dealing with this disease should be enacted. I have asked Dr. Pollard to write something on this subject, as very little of the work with this disease comes under my observation. (See his report.)

NURSERY INSPECTORS.

After the passage of the law providing for a State nursery inspection and nursery inspectors, Mr. A. E. Stene of the State Agricultural College was appointed to fill the position. He has inspected every nursery in the State which he has been able to locate. His report appears as a part of this report.

GYPSY MOTH.

The damage being done to our shade trees by the Gypsy moth was called to the attention of the Board by Mr. Edward H. Armstrong, of Providence, who stated that along Elmwood avenue and Broad street, all through that section of Providence, much damage had been done by this moth, and that unless something was done at once to stop its spread, it would cost many thousand dollars to control it; while, at the present time, he estimated that with an expenditure of about $3,000 the moth could be practically exterminated, and then, with the expenditure of a few dollars each year, it could be kept under control so it would do little or no damage. On the other hand, if left to spread, it would soon cover the entire State and the damage done would amount to many thousands of dollars, not only to shade trees but to our woodlands and orchards as well.

By invitation of Secretary Elsworth, of the Massachusetts State Board of Agriculture, the secretary of this Board, accompanied by Mr. A. E. Stene of the State College of Agriculture and Mechanical Arts, went to Boston and met Professor E. P. Felt of the New York

Department of Agriculture, and Mr. G. G. Atwood, and were taken by Secretary Elsworth to Malden and taken for a drive through Malden, Melrose, and Medford, the towns where the Gypsy moth had done such great damage, and it was the opinion of every man in the party that radical steps should be taken to stop the further spread of this pest. It was suggested that the United States Department of Agriculture ought to take the matter in hand, for it was considered too great a task for the State to undertake and was a matter of national importance; for if allowed to spread, it would soon ruin many thousand acres of woodland, to say nothing of the shade trees and shrubbery. We found in all three of the above mentioned towns places where the moth was so thick that they had entirely killed many trees. Egg patches were to be found on trees, weeds, stones, or any little pieces of wood; around trunks of trees were dead moths—in some cases, an inch deep. We found one whole orchard that was nearly if not quite dead, the trees having been robbed of the foliage two years in succession. They even crawl upon houses and in the doors and windows in such numbers as to make life miserable for the inhabitants. In one or two cases, at least, the families were obliged to move out, and others told us they were going to move, for they could not live in the house with caterpillars all over the house and in the beds. One man had a band of some sticky material some six inches wide all around his house, about two feet above the ground, thinking the caterpillars would get stuck and thus not be able to climb up the side of the house; but they went in such swarms that the dead soon bridged this material over, and the rest crawled over the dead caterpillars, up and into the house, almost as thick as if nothing had been done to prevent them. Then it was that we saw the magnitude of the danger of this pest, not only to trees, but to the inconvenience and trouble they cause the people in the vicinity of a colony.

The executive committee of this Board held a public hearing on the subject, which was largely attended by many prominent business men of Providence, Pawtucket, and Newport, as well as from other parts of the State, and all agreed that some radical action be taken at once to stop the further spread of the pest and looking toward its extermination. This hearing resulted in the Board's asking the legislature for an appropriation of three thousand dollars for that purpose, but the legislature did not see fit to make the appropriation, so nothing has at present been done. I would refer you to the paper by Mr. Stene and Mr. Armstrong, which appear in another part of this report, for further particulars in regard to this subject.

THE AGRICULTURAL COLLEGE AND STATE EXPERIMENT STATIONS.

The most friendly relations possible now exist between the Board and the College and Experiment Stations, and we are glad to exert an influence to further the interests of those institutions.

It is with pleasure that we note the growth of the College during the past year, and especially the increase in the number of agricultural students. We heartily endorse the present administration of President Butterfield, and wish him all possible success in the management of the institution. We believe, however, that for the proper teaching of agriculture a green-house and poultry plant are necessary, and we urge upon the legislature the importance of an appropriation for both these departments as soon as possible. The growing of flowers and vegetables under glass has increased very rapidly during the past few years, and the College surely ought to be prepared to teach this important industry; while the magnitude and importance of the poultry industry is so well understood that all will agree our College should have a complete poultry plant and be able to properly teach the business in all its branches.

We heartily recommend to the young men and young women of this State, who desire to obtain a better education, to take one of the courses offered at this institution.

Of the work at the Experiment Station I need say nothing; its value and importance are already understood, and our farmers are paying more attention to the results of the various experiments and are profiting thereby. Among the many valuable experiments that have been conducted might be mentioned the use of lime on acid soil and the use of chemicals in growing grass, both of which have proved of great value to our farmers.

We urge all to read carefully the various bulletins published, and to visit the Experiment Station plots and see for themselves the work being done. Visitors are always welcome, and there is always someone there who is glad of the opportunity to explain the various plots and experiments.

ABANDONED FARMS.

There are many farms in this State at the present time that are unoccupied and are for this reason termed abandoned farms. Many of these farms are for sale at a very low price.

In 1900 this Board published a pamphlet describing many of these farms. The demand for these pamphlets was so great that a second issue was printed, which has also been exhausted, and still we receive a great many calls for a list of such farms. Perhaps it is not the work of this Board to furnish free advertisements of the farms for sale in the State, but it would seem that we ought to publish such a list for the benefit of those desiring to buy farms. The expense of such an edition is not large, and if it will help in a way to get these farms again occupied, it would surely be a profitable investment for the State. There are a good many of these farms which could be made very profitable if managed in the right way. This would increase the value of these farms, and thus increase the revenue of the towns and State. I recommend that we publish another issue of these pamphlets after the same has been revised and corrected.

LIST OF BREEDERS OF THOROUGHBRED STOCK OF ALL KINDS.

During the past year many requests have been made for lists of breeders of cattle and poultry in Rhode Island. It would cost but a little to compile such a list, and maybe it would not be complete the first year; but within a year or two all the breeders would make themselves known, and it surely would be of great value to not only the breeders themselves, but to the farmer as well, for it would enable them to know right where they could get good stock without having to go out of the State for it, and it would also advertise all over the country our live stock interests.

I have said before that we do not care to advertise any man's business for him only, as it will be a benefit to the entire State. Our business is, however, to boom agriculture in Rhode Island, and it appears that this is one way we can do it.

I recommend this matter to the consideration of the Board, and suggest that such a list be printed.

AGRICULTURAL SOCIETIES.

We have in this State two agricultural societies, two horticultural societies, and one poultry association, which draw a bounty from the State, and their reports appear in another part of this book. We also have several smaller societies which are of a different nature, not holding exhibits, but simply meetings, and discussing various topics in connection with their business. They are all local and do not reach out over the State, although the R. I. Horticultural Society does have a membership all over the State and holds regular monthly meetings, doing much valuable work by awakening an interest in the industry. This society confines itself to horticulture only. Then, too, we have the Grange, which is a very valuable organization, reaching many people in all parts of the State. The Grange, for a secret organization, can not be improved upon, and they should be encouraged in the work. Probably no organization has done more for the interests of agriculture, not only in Rhode Island, but all over the United States, than the Grange, but it being a secret order keeps many from joining who otherwise would do so.

Thus we see the need of a society or organization of farmers covering the entire State, whose membership should be open to anyone in the State interested in agriculture, and having for its purpose the advancement of agriculture in Rhode Island. I recommend to this Board that it lend its influence to the organization of such a society.

Respectfully,

JOHN G. CLARKE,

Secretary.

REPORTS OF CATTLE COMMISSIONERS.

To the State Board of Agriculture:

I wish to present a brief report of my work as cattle commissioner for Washington county.

In am of the opinion that we are keeping tuberculosis under control in my county; I find that the farmers more and more realize the magnitude of this disease and are anxious to rid their herds of it. They notify me immediately when they think they have a case, not waiting until the disease is far advanced. This lessens the danger to other cattle.

I find that the farmers are also paying more attention to the sanitary condition of their barns, but there is still room for improvement. Some do not realize the importance of keeping the stables clean and light. I urge all who wish to clean their herds to keep the stables clean.

I also think that there is a tendency to overwork our cows, which breaks them down and makes them more apt to contract the disease. They should be allowed more rest and not milked right up to calving time and not overfed. Some try to milk a cow just as long as she will give milk, which leaves them in a run-down condition, and she does not have time to get her strength back before they are milking and forcing her again by overfeeding her with such feeds as cottonseed meal and gluten meal. More attention should be paid to this subject, and the farmers should be more careful what they feed and how they feed it.

I might say just a word on the subject of in and in-breeding of live stock. I find that the farmers that in-breed their cattle are the ones that have the most disease. I have thought for a long time that in-breeding was largely responsible for the weakened condition of our live stock, and since I have been cattle commissioner I am even more convinced on this point, and I earnestly believe that in-breeding is a dangerous practice, and the farmers ought to be very careful and introduce new blood into the herds every few years.

Respectfully submitted,

P. A. MONEY,

Cattle Commissioner for Washington County.

To th State Board of Agriculture:

During the year 1904 I have examined 2,470 head of cattle and have found 52 head that were tuberculous, which were killed by the State veterinarian. I also found one stable of horses where there was glanders, and there were three killed by the State from the stable. We found a few other cases in the county, but one only in each place.

GEORGE COGGESHALL,
Cattle Commissioner for Newport County.

To the State Board of Agriculture:

During the year 1904 I have examined about the usual number of cattle, and have found more tuberculous cattle than in the previous year. I have found the farmers, in most cases, ready and willing to have their stables disinfected.

Yours respectfully,
HENRY S. TURNER,
Cattle Commissioner for Providence County.

JAN 1, 1905.

To the State Board of Agriculture:

My experience as cattle commissioner of Bristol county is to the effect that farmers are in better relation to the commissioners than when the commissioners were first appointed; from looking apprehensively or suspiciously upon the commissioners, they manifest a desire to listen to their recommendations and seek their advice.

It is gratifying to state that they are taking more interest in the sanitary condition of their buildings and farm methods.

Whatever changes may be deemed necessary in the laws pertaining to cattle, it is along the line of improving sanitary conditions that the changes should be directed.

Respectfully,
WM. WILLIAMS,
Commissioner, Bristol County

To the State Board of Agriculture:

GENTLEMEN:—In compliance with the request of your secretary, I herewith submit my report as one of the cattle commissioners of Washington county.

During the past year I have inspected 183 head of cattle, of which 95 head have been imported from adjoining States, and 88 head of native cattle. Twelve head have been found diseased and slaughtered.

That conditions still continue to exist which are beyond the control of the cattle commissioners, and which can be stopped only by the enacting of more stringent laws governing the importation of cattle into the State and compulsory on owners of those within, is evident to every careful observer.

Respectfully submitted,

T. D. BABCOCK,

Commissioner, Washington County.

To the State Board of Agriculture:

I have the honor to submit my annual report as veterinarian to the Board for the year ending December 31, 1904. During the year we have been very fortunate in having nothing to combat other than tuberculosis and glanders, which in themselves are a menace to the live stock interests of our State, and are being combated in as thorough a manner as is possible with the means at our command.

According to the U. S. census of 1900, the number of horses, cattle, sheep, and swine owned in the State was nearly 100,000 head, with a value of more than four millions of dollars, the dairy products alone being worth almost two million dollars; and it is for the protection of the owners of these animals and the public in general that the Board is carrying on a work that is of very great importance to each and every inhabitant of this State, but, sad to relate, there are many who view it from a pessimistic standpoint, owing, no doubt, to a lack of information as to what is being done by the Board along these lines.

During the year I have travelled about 12,000 miles, and have inspected animals in every city, town, and hamlet in the State. I have examined 5,673 head of cattle, sheep, and hogs, and 352 horses, and out of this number have condemned 538 cows, 8 bulls, 5 oxen, 9 sheep, and 22 hogs, which, upon autopsy, proved to be affected with tuberculosis in its many forms (— of these animals had pulmonary lesions other than tuberculosis), and 93 horses which were suffering from glanders and farcy. In regard to the latter diseases, it is safe to say that many more have been destroyed other than those that have been brought to my attention, owing to the fact that a person conducting a boarding stable in the large cities is averse to having it known among his patrons that any of the animals under his care have any contagiuns disease, and the result is they are removed without delay for fear of the fact becoming known, for if generally known it has a tendency to injure his business. Then again, many are taken to the country districts, especially in the grass season, in hopes that it may be of benefit, but eventually they die of exhaustion and are buried. I would recommend that all rendering establishments doing business in the State be required to make an annual return to this Board of the number of carcasses of glanders and farcy collected during the year, so that we may better know to what extent this disease exists.

In regard to tuberculosis: We are doing the best we can under the existing laws, which, if more stringent as regards cattle entering the State, might be of direct benefit to all concerned, but unfortunately they are not, and all we can hope to do is to hold it in check.

In regard to sanitation: A marked improvement is seen in most of the stables throughout the State, but it is a deplorable fact that some are in bad sanitary condition. A system of disinfection is now carried on by the Board and will undoubtedly bring about good results in the near future.

JOHN G. POLLARD.

CATTLE KILLED DURING YEAR 1904.

	Cows.	*Bulls.*	*Oxen.*	*Hogs.*	*Sheep.*
January.					
Bristol County		....	....	....	....
Kent County	4	....	....	....	....
Newport County		....	....	....	....
Providence County	20	2	....	....	....
Washington County	1	....	....	....	....
	25	2	....	....	....
February.					
Bristol County		....	....	....	....
Kent County	10	....	....	....	....
Newport County	7	1	....	....	....
Providence County	30	....	....	....	....
Washington County	5	....	....	....	....
	52	1	....	....	....
March.					
Bristol County		....	....	....	....
Kent County	4	....	....	....	....
Newport County	4	....	....	....	....

	Cows.	*Bulls.*	*Oxen.*	*Hogs.*	*Sheep.*
Providence County	21	....	....	....	....
Washington County	4	....	....	....	....
	33	....	....	....	....
April.					
Bristol County		....	....	....	....
Kent County	15	....	....	4	....
Newport County	5	....	....	....	....
Providence County	38	....	1	5	....
Washington County	6	....	....	2	....
	64	....	1	11	....
May.					
Bristol County		....	....	....	....
Kent County	4	....	....	3	....
Newport County	5	....	....	....	....
Providence County	37	....	....	....	....
Washington County		....	....	....	....
	46	....	....	3	....
June.					
Bristol County	..	....	....	....	....
Kent County	3	....	....	....	....
Newport County	3	....	....	....	....
Providence County	20	....	1	....	....
Washington County	8	....	1	1	....
	34	....	2	1	....
July.					
Bristol County	1	....	....	....	....
Kent County	3	....	....	....	....
Newport County	7	....	....	....	....
Providence County	15	....	....	....	....
Washington County	4	....	....	....	....
	30	....	....	....	....

August.	*Cows.*	*Bulls.*	*Oxen.*	*Hogs.*	*Sheep.*
Bristol County	....	....	....	....	....
Kent County	4	....	....	....	....
Newport County	3	....	....	....	....
Providence County	17	....	....	....	....
Washington County	7	....	....	....	....
	31	....	....	....	....
September.					
Bristol County	1	....	....	....	....
Kent County	5	....	....	....	....
Newport County	2	1	....	....	....
Providence County	16	....	....	....	....
Washington County	4	....	....	....	....
	28	1	....	...	....
October.					
Bristol County	....	....	....	....	....
Kent County	7	....	....	1	....
Newport County	....	....	....	....	....
Providence County	62	1	....	....	....
Washington County	16	....	....	5	....
	85	1	....	6	....
November.					
Bristol County	1	....	....	....	....
Kent County	4	....	....	....	....
Newport County	12	1	....	....	....
Providence County	38	....	....	1	....
Washington County	10	1	....	....	9
	65	2	....	1	9
December.					
Bristol County	2	....	....	....	...
Kent County	4	....	....	....	....

	Cows.	*Bulls.*	*Oxen.*	*Hogs.*	*Sheep.*
Newport County	1	....	....	....	....
Providence County	35	1	....	....	....
Washington County	3	....	....	....	....
	45	1	....	....	....

Total of 538 cows, 8 bulls, 3 oxen, 22 hogs, 9 sheep = 580.

Six cattle were killed during the year that were found to be healthy.

50

.03 2/3

15000) 550.00

45000

10

550

6

3300 [illegible]

30.000

.30 [illegible]

found

9000) 550.00 .06

54000

1:16

REPORT OF NURSERY INSPECTOR A. E. STENE.

The alarming spread of the San Jose scale throughout the East within the last fifteen years has led to the enactment by various states of certain inspection laws which are designed to prevent the dissemination of this pest, and also of other insects and of plant diseases which may be of an alarmingly injurious character. At first these laws were enacted by only a few states, but most of the remaining ones have gradually followed, because they have found that unscrupulous nurserymen have taken advantage of the absence of inspection laws and have shipped into such states nursery stock which could not be sent to those having prohibitive laws. The writer, in his travels throughout Rhode Island, has found plenty of evidence that this state has been used as a dumping ground for condemnable stock. Thanks to the activities of the Board of Agriculture a year ago, the state fortunately can no longer be so used. The legislature at its last session enacted a law, framed by the secretary of the board, which, if properly supported, will serve to place the state in line with others who are making an effort to check the spread of injurious insects and plant diseases through the sale and distribution of nursery stock. The law thus enacted is as follows:

CHAPTER 1159.

AN ACT TO AUTHORIZE THE STATE BOARD OF AGRICULTURE TO APPOINT A STATE NURSERY INSPECTOR, AND TO PROVIDE FOR THE PROTECTION OF TREES AND SHRUBS FROM INJURIOUS INSECTS AND DISEASES.

[Passed April 13, 1904.]

It is enacted by the General Assembly as follows:

SECTION 1. The state board of agriculture may annually appoint some person, qualified by scientific training and practical experience, to be state nursery inspector, who shall be responsible to the board for the performance of his duties as prescribed in this act.

SEC. 2. It shall be the duty of the state nursery inspector to inspect, under the direction of said board, all nurseries or places in the state where nursery stock is grown, sold, or offered for sale, and if no dangerous insect or fungous pests are found therein a certificate to that effect shall be given. If such pests are found therein the owner of the stock shall take such measures to suppress the same as the state nursery inspector shall prescribe, and no certificate shall be given until the said inspector has satisfied himself by subsequent inspection that all such pests have been suppressed.

SEC. 3. Owners of nurseries or of places in the state where nursery stock is grown, sold, or offered for sale, who do not hold an unexpired certificate of inspection after the first annual inspection made after the passage of this act, who shall sell or otherwise dispose of nursery stock in the state shall be subject to a penalty of not less than ten nor more than fifty dollars for each offence.

SEC. 4. Owners of nurseries or of places in the state where nursery stock is grown, sold, or offered for sale, who shall fumigate with hydrocyanic acid gas all stock which they sell, using at least two-tenths of a gram of potassic cyanide to every cubic foot of space contained in the box, house, or other place wherein this fumigation is performed, which place shall be gas tight, and who shall expose the said stock to the fumes of this gas of the strength aforesaid for at least forty minutes, or who shall treat the stock which they sell by some other method approved by the state nursery inspector, and who shall make affidavit before an officer authorized to administer oaths that all stock sold by them has thus been fumigated or treated, and who shall attach a copy of such affidavit to each package, box, or car of stock sold, shall be exempt from the provisions of sections two and three of this act.

SEC. 5. All nursery stock shipped into this state from any other state, country, or province shall bear on each box or package a certificate that the contents of said box or package have been inspected by a duly authorized inspecting officer and that said contents appear to be free from all dangerous insects or diseases. In case nursery stock is brought within the state without such a certificate the consignee shall return it to the consignor at the expense of the latter: *Provided, however*, that any package or box bearing a certificate of fumigation which meets the requirements specified in section four of this act may be accepted as though bearing a proper certificate of inspection.

SEC. 6. The state nursery inspector shall at all times have the right to enter any public or private grounds in the performance of any duty required by this act. He shall receive from the annual appropriation of the state board of agriculture such compensation as said board may determine.

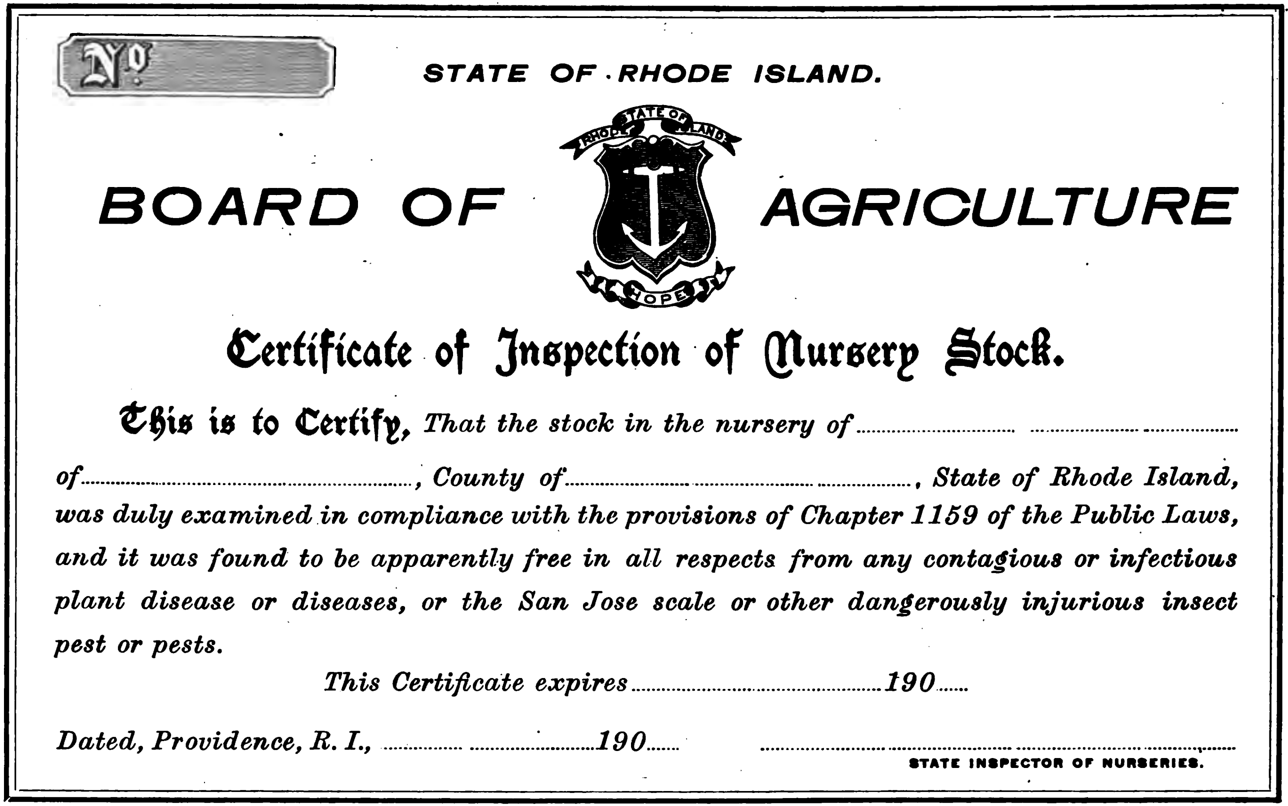
SEC. 7. This act shall take effect upon its passage.

A true copy.

Attest:

CHARLES P. BENNETT,

Secretary of State.



No.

STATE OF RHODE ISLAND.

BOARD OF AGRICULTURE

Certificate of Inspection of Nursery Stock.

This is to Certify, *That the stock in the nursery of ....*

of ...., County of ...., State of Rhode Island, was duly examined in compliance with the provisions of Chapter 1159 of the Public Laws, and it was found to be apparently free in all respects from any contagious or infectious plant disease or diseases, or the San Jose scale or other dangerously injurious insect pest or pests.

This Certificate expires ....190......

Dated, Providence, R. I., ...190......

....
STATE INSPECTOR OF NURSERIES.

REMARKS ON THE LAW AND ITS OPERATION.

As will be noticed, the law is shorter than that of a good many States, but it is hoped that if it is lived up to it will cover all essential points. Legislation to prevent the increase and spread of injurious insects is in a formative and still imperfect condition, and as such it must needs receive attention and changes from time to time, as experience dictates. The tendency will be, as time goes on and people have opportunity to get acquainted with the working of preventive measures and to adjust themselves to the requirements of such legislation, to increase the strictness of inspection and to require greater efforts to keep clean, not only the grounds of the nurseries, but also the land in the immediate vicinity. Some states, notably New York, are extending their inspection laws so as to include orchards as well as nurseries, and this probably indicates the trend of legislation throughout the whole country.

It should be remembered, in connection with legislation of this kind, that, while it is designed to prevent the spread, and as far as possible to lead to the destruction of injurious insects, yet when certain pests have gotten a foothold, as, for instance, the San Jose scale, it will take years before the people become so thoroughly educated to the means of assisting in this work that the task can be brought to a successful termination. It must also be remembered that, no matter how conscientious and thorough is the inspection of a nursery, absolute freedom from insect pests or plant disease is not and cannot be guaranteed. All certificates, as issued by state inspectors at the present time, read that "the nursery is apparently free from injurious insects and plant diseases." For instance, it is almost impossible for the inspector, no matter how rigid his inspection, to always detect the presence of crown gall, or of woolly aphis in some of its stages; and scattered individuals of the San Jose scale may easily escape his attention. It is, therefore, necessary that the nurseryman should give his most cordial and conscientious co-operation in order that the spirit of the law may be carried out and the full benefit be derived from it. The buyer of nursery stock, also, should acquaint himself with the principal injurious insects and plant diseases; and no matter how well known the nursery is, or how well the stock is certified, he should examine closely all plants purchased by him, and if any suspicious evidence of pests is found he should notify the inspector at once.

HOW THE LAW HAS BEEN RECEIVED.

As a general rule, the nurserymen of the state are thoroughly in accord with the principles of the law and realize its value to them. It prevents shipping in of cheap, worthless, and condemned stock to compete with well-grown stock raised within the state. It will teach greater care in growing and handling nursery stock, and will gradually weed out careless and irresponsible dealers. The inspector, in nearly every case, has met with a ready compliance with all of his recommendations. The nurserymen are anxious to have their grounds in perfectly clean condition. Some have gone so far as to destroy doubtful stock, even though close scrutiny failed to reveal the presence of any serious pests. A great many nurseries of the state are in excellent condition, and their general appearance indicates that every care is being used to keep the stock in first-class condition. Others are not in such good condition, and the work of inspection and the prescribing of regulations for removing infested stock becomes much more difficult.

FUMIGATION.

Some states require that stock shipped into them from outside their border shall be fumigated. In the future other states are likely to make this provision part of the requirements of the law. Fumigation with hydrocyanic acid gas, although not an absolute safeguard against the introduction of crop pests, is nevertheless the best that we have, if it is correctly carried out. Nearly all larger nurseries in other states have arrangements for fumigating their stock, even though inspection does not reveal the presence in their grounds of any injurious insects. The appliances required for such fumigation are quite simple, and the cost of the work is not very great. It is recommended, therefore, that all nurseries should supply themselves with some means for fumigating at least doubtful stock, not only to protect their customers, but also to treat such stock as they may themselves purchase for propagation purposes. It is well to remember in this connection that the best nurserymen at the present time do not use fumigation as a means of preparing trees or shrubbery, known to be infested with scale, for the market. Fumigation will undoubtedly kill the scale, but the evidences of its presence will still be there, and it will do lasting injury to the nurseryman's business to expose such goods for sale. A short description of a fumigation house and box will be given in this article, which, if followed, will enable any one to construct for himself all the appliances necessary for doing the work.

It is a prevalent notion that fumigation is sometimes injurious to at least the more tender varieties of nursery stock. This notion is apparently emphasized by the fact that a few of the larger nurseries advertise in their catalogues that, while they have certificates of inspection for their nurseries, they will fumigate their stock, if so required, at the risk of the purchaser. Numerous experiments, however, by private parties and by experiment stations, go to show, without a doubt, that fumigation according to the requirements of inspection laws is not injurious to such stock as may require it, if properly carried out. The Rhode Island State law requires that two-tenths of a gram of cyanide be used for each cubic foot of fumigation space, and that the stock be exposed to the gas for forty minutes. Numerous experiments on all kinds of nursery stock have proven that even larger quantities of the gas can be used if the duration of exposure to it does not exceed one hour.

It is important to remember, in fumigating, that the trees should not be wet. Another item of importance is the quality of the potassium cyanide. Last year the Virginia Crop Pest Commission collected a number of samples of cyanide from various dealers, all of which were labelled 98% pure. It was found that only two of them reached the required standard. One was 95%, and the rest ranged from 47% to 55%. It is, of course, evident that if a poor quality of cyanide is used the object of the fumigation will be defeated, because all formulæ are based upon the 98% chemical. The cyanide should therefore be purchased of some reliable dealer, in original packages, or else directly from the manufacturer.

NOTES ON INSPECTION.

The work, being new, has required careful attention and repeated visits to many nurseries. According to law no certificate can be granted to any nurseryman as long as injurious insects or plant diseases are present on his nursery stock. It is also highly desirable that neighboring grounds, at least on the nurseryman's own premises, should be cleared of trees or shrubbery affected with any injurious pests. Some states give inspectors power to require that premises belonging to private parties in the immediate neighborhood of nurseries shall be kept free from all dangerous or injurious insects or diseases. I believe that this provision is a good one, as a nurseryman can not be really sure that his nursery is clean as long as land belonging to his immediate neighbor is infested. The law should also provide for the destruction by the community of wild cherries, volunteer apple trees, and other trees or shrubbery growing along the roadsides or on public property, which may serve as breeding grounds from which scale, tent caterpillars, black knot, and other injurious insects or diseases may originate and be distributed.

Nurserymen wishing to treat the trees in their grounds, other than their nursery stock, for the San Jose scale, can effectually do so by the application of the lime, sulphur, and salt mixture. This can be prepared in two ways, either by boiling or by the use of caustic potash. Full directions for the preparation and use of this mixture will be found in the article "Notes on Rhode Island Fruit Growing," in this report.

The insect which requires the greatest attention on part of nurserymen and fruit growers is, of course, the San Jose scale. It is found on a large number of trees and shrubs commonly grown in nurseries. The principal ones are here given, in the order of their liability to be infested, as found in the inspection work last fall:

Currant,
Rosa Rugosa (other roses occasionally),
Hawthorn,
Red Twigged Dogwood,
Flowering Quince,
Gooseberry,
Peach,
Apple,
Purple Plum (Prunus Pissardii),
Pear,
Elms,
Willows,
Mountain Ash,
Plums (European and Japanese),
Persian Lilac,
Poplars, varieties,
Elaeagnus Longipes,
Beach, Purple,
Quince,
Baswood,
Euonymus,
Bladdernut (Staphylea).

Among other plants, some of which are reported from other states as being subject to scale, but which we have not so far found infested in the nurseries of this State, are the following:

Ailanthus,
Althea,
Ash,
Barberry,
Beech,
Box,
Butternut,
Calycanthus,
Catalpa,
Chestnut,
Conifers, all species,
Deutzia,
Flowering Dogwood,
Forsythia,
Ginkgo,
Grapes,
Hercules Club,
Hickory,
Holly,
Honeysuckle,
Horse Chestnut,
Judas Tree,
Locusts,
Maple,
Mountain Laurel,
Mulberry,
Oaks,
Privet,
Raspberry,
Rhodotypus,
Smoke Bush,
Spirea,
Stephanandra Flexuosa,
Sweet Gum,
Syringa,
Tamarix,
Trumpet Vine,
Tulip Tree,
Viburnum,
Walnut,
Wistaria.

Nearly all varieties of our common fruit trees are liable to be infested.

The Kieffer pear seems, in some cases at least, to be an exception. Individual trees of this variety have been found free from scale, as far as very careful examination would reveal, when standing in nursery row between other varieties badly infested with the insect. Yet the writer has seen fruit of the Kieffer brought to one of our country fairs which was largely covered with the scale. It was reported on good authority that the tree from which the fruit came was thoroughly infested.

NUMBER OF NURSERIES.

Up to the present time there have been reported to the inspector's office seventeen different parties in the State who grow for sale, or deal in nursery stock. Of these, twelve have cleared their nurseries so as to receive certificates, two have signified their intention of selling under section 4 of the law, two were reported too late to finish the inspection, and a new nursery was reported too late to make even a preliminary inspection. In addition to these there are a number of florists who order stock, as wanted, for some of their customers. As far as we have learned of these they have been notified to see to it that all stock bought is properly certified.

FUMIGATION HOUSE.

The essential feature in a fumigation house or a box is to have it as nearly air-tight as possible. The cheapest construction of walls, roof, and floor is double boarding with one or two layers of tar paper between. In a house the frame and first layer of boards should be constructed on the box plan, in such a way that strips of the paper can be applied beginning at the base of one wall and extending up and over the roof to the base of the opposite wall. Let the strips lap 5–6 inches. Projecting rafters or studdings, to get around which the paper has to be broken, should be avoided. If such have to be used, extra layers of paper should be placed around them so as to make

the joints air-tight. This also applies to doors and ventilators. It is recommended that two layers of paper be used between the boarding all around the building, including the roof and floor. The first layer of boards for the walls should be matched flooring. The second may be matched or lapped siding, as indicated by figure 1, placed horizontally, or boards planed on one side with weather strips, nailed vertically, as shown in figure 2.

The roof may be shingled, or may be built like the wall, with planed boards and weather strips.

Partitions may be built in a similar way, but may be constructed of a cheaper grade of boards. The floor is constructed in a similar manner, placing a fair grade of flooring for the top layer.

In order that the gas may have access to all parts of trees to be fumigated, the floor should have a removable slat grating on which the stock may be laid.

Doors and ventilators should be made similar to those of a refrigerator, and of double boarding, with paper between. like the walls. Doors should have three, and ventilators two hinges. They should close by means of clamps, like those of a refrigerator. Heavy felt strips should be glued to both doors and casing where they come together.

The plans as drawn may be varied in dimensions to suit each individual nurseryman's needs. The plan presented in figure 3 is large enough for the biggest nursery in the State. The house is 8 feet high in front and 6 feet in the rear, and the larger room contains 980 cubic feet. At .2 grams per cubic foot this will take 196 grams cyanide, or approximately 7 ounces.

For tender stock this should not be exceeded; but for the bulk of fumigation work that a nurseryman has to do, 1 ounce per 100 cubic feet is in common use, or 9½ ounces approximately for the room given.

The writer is indebted to the Orange Judd Co. for permission to use cuts of fumigation house given in figures 1 and 2. They are taken from the book entitled "Fumigation Methods," by Willis G. Johnson. This is the most complete treatise on fumigation with which the writer is acquainted, and should be in the hands of every nurseryman. Credit is due to this book and to various experiment station bulletins for a large share of the suggestions on fumigation given in this report.

The small room contains 180 cubic feet, which at .2 grams per cubic foot would take 1¼ ounces and at 1 ounce per 100 cubic feet would require about 1¾ ounces cyanide. The small room given in the plan may be used for fumigation or for storing of chemicals and apparatus. When not used for fumigation purposes the other rooms may be used for storage or work shop.

Where only small quantities of stock are to be fumigated a box like that shown in figure 4 will serve the purpose very well. It is built of double boards with paper in between. The cut will show the plan sufficiently so that a carpenter can easily construct it. It contains 100 cubic feet and will take approximately ⅔-ounce if .2 of a gram is used per cubic foot, or 1 ounce according to the other plan.

A few nurserymen have an oiled canvas tent which can be placed over a wagon loaded with nursery stock. The edges are weighted down and made tight by piling dirt on them. If carefully done, fumigation with such apparatus will be efficient; but it is doubtful if it is any cheaper in cost or more economical in time than the construction and use of a fumigation house as already described. A few large nurseries in other States have built fumigation houses large enough to hold a loaded wagon. Such an arrangement is no doubt economical of time, but the cost of house and of fumigation is materially greater.

In addition to the house or box the only apparatus needed is one or two crocks holding about ½-gallon, an 8-ounce glass graduate for measuring acid and water, and some paper bags in which to weigh out the cyanide.

A great many formulæ giving the proportion of acid and water to cyanide are in use. A common one is to take half again as much acid as cyanide and half again as much water as acid. As the acid is quite cheap and the commercial brand is apt to vary in strength, a great many use the 1–2–4 formula, or 2 ounces acid and 4 ounces water to every ounce of cyanide. The cyanide, as already noted, should be 98% pure. The acid may be ordinary commercial sulphuric, which can be obtained of any druggist or dealer in chemicals.

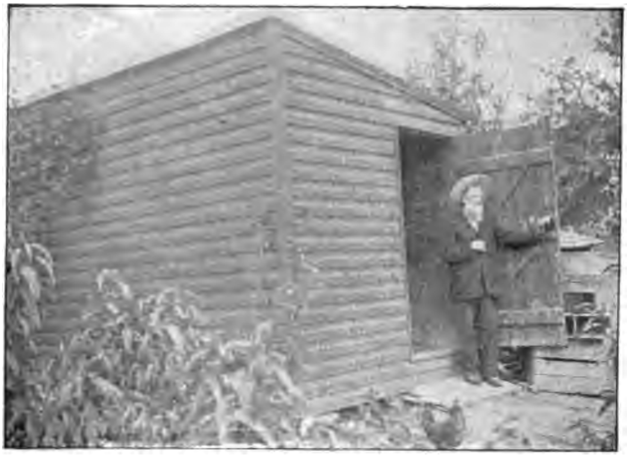


FIG. 1.

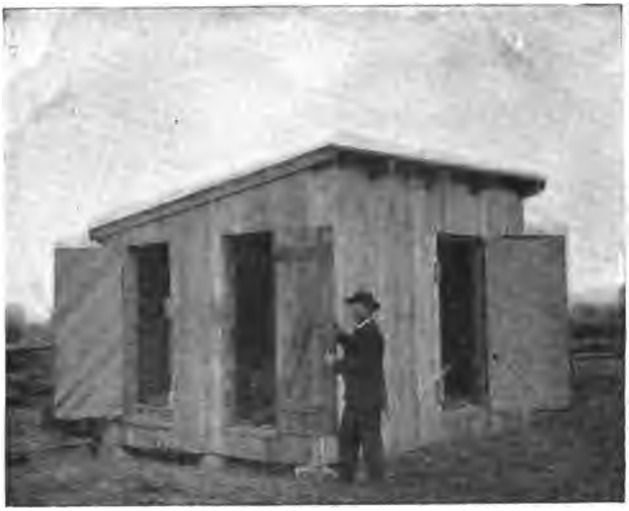


FIG. 2.

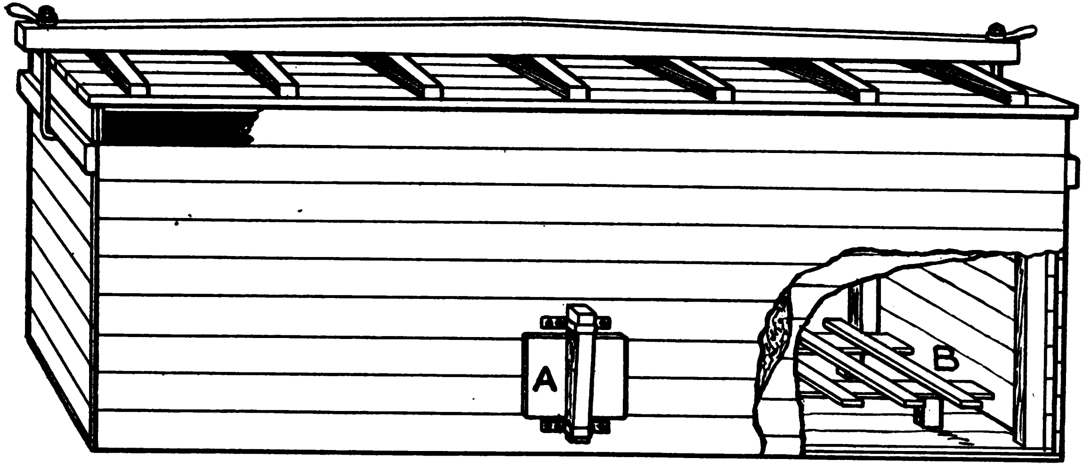


FIG. 4.

In connection with fumigation work of this kind the following points should be kept constantly in mind.

The *potassium cyanide and the gases produced from it are exceedingly poisonous. The gas must not be inhaled, and the cyanide should be kept where children can not get at it.* The residue, after fumigation, should be buried. The crocks should be cleaned out after each fumigation.

The stock should be piled loosely, and must not be packed at time of fumigation.

Never repeat the fumigation of the same stock.

Stock may be fumigated if only slightly damp, but never when wet.

Evergreens seldom, if ever, need fumigation.

Fumigate only when trees are in dormant condition.

Lose no time in getting out and shutting door after cyanide has been dropped in acid. The best way is to lower cyanide into crock by means of a string operated from the door. Have the roots as free from dirt as possible at time of fumigation.

ABSTRACTS OF LAWS IN OTHER STATES.*

ALABAMA.—The State Board of Horticulture controls inspection within the State; nurseries are examined each year. Persons outside the State, to do business in Alabama, must file duplicate certificates of inspection with the secretary of the Board of horticulture and obtain official tags for each box or package. (Code of 1903, No. 121). Mr. R. S. Machintosh, State Horticulturist, Auburn, Ala.

ARIZONA.—No law. Mr. R. H. Forbes, Director, Agricultural Experiment Station, Tucson, Ariz.

ARKANSAS.—Shipments of nursery stock into the State must be accompanied by a certificate of inspection, otherwise the transportation company must notify the consignor and cannot deliver the shipments until a certificate is furnished. (Laws of 1903.) Mr. Ernest Walker, Entomologist and State Inspector, Fayetteville, Ark.

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*Copied from a report of the Department of Agriculture ot New York, by permission of Chas. A. Wieting, Commissioner.

CALIFORNIA.—Inspection is made of all nurseries and orchards of the State. Shipments into the State are subject to inspection on arrival and must be marked with the name and address of the shipper, name of consignee, and name of place where grown. Notice of shipment should be given to Mr. Alexander Craw, Deputy Commissioner of Horticulutre, Ferry Building, San Francisco, Cal.

COLORADO.—Stock subject to inspection by county inspectors, appointed by State Board of Horticulture, Denver, Col.

CONNECTICUT.—Certification and treatment of nursery stock is discretionary with the State Entomologist. Shipments of nursery stock into the State shall bear a statement that it has been thoroughly fumigated, in addition to the certificate of inspection issued by a State or Government officer. (Chapter 338, Laws of 1903.) Mr. W. E. Britton, State Entomologist, New Haven, Conn.

DELAWARE.—Shipments into the State must bear a certificate of inspection from a duly qualified officer of the State in which the shipment originated, given not earlier than September 1st. Fumigation may be required by State Board of Agriculture. Mr. Wesley Webb, Inspector, Dover, Del.

FLORIDA.—No law. Certificates to nurserymen are issued by Prof. H. A. Gossard, Entomologist, Agricultural Experiment Station, Lake City, Fla.

GEORGIA.—Nurseries are inspected regularly. Duplicates of inspection certificates, together with a signed statement by the nurseryman that all stock intended for Georgia will be fumigated in accordance with directions furnished them, must be filed in the office of the State Entomologist. The official tags of the State Board of Entomology will be furnished by the State Entomologist at actual cost of printing. Each shipment into the State must be labelled with the official tag and also with the certificate of inspection of the State from which the shipment is made. (Regulations adopted Jan. 6, 1904.) Mr. Wilmon Newell, State Entomologist, Atlanta, Ga.

IDAHO.—No person can engage in the business of selling or importing nursery stock without filing a bond and acquiring authority from the State Board of Horticulture. Shipments into the State must bear an authorized certificate of fumigation, together with labels on each package showing names of consignor, consignee, and name of place where stock was grown. Mr. A. McPherson, State Horticultural Inspector, Boise, Ida. (Horticultural Law, Seventh Session.)

ILLINOIS.—Nurseries are subject to inspection by the State Entomologist. Shipments into the State must be accompanied by certificates of inspection. Prof. S. A. Forbes, State Entomologist, Urbana, Ill.

INDIANA.—State nurseries shall be inspected at least once each year. Every package shipped into the State should be labelled with the names of consignor and consignee and a certificate of a State or Government inspector of current year's date. (Chapter 138, Laws of 1899.) Prof. J. Troop, State Entomologist, Lafayette, Ind.

IOWA.—State nurseries are inspected at owner's request or if supposed to be infested with scale, and nurserymen are prohibited from shipment without the inspection. Shipments into the State must be accompanied by a certificate of apparent freedom from scale. (Chapter 23 of the 27th General Assembly.) Prof. H. E. Summers, State Entomologist, Ames, Ia.

KANSAS.—No law. The governor has granted a commission to Mr. E. A. Popenoe, Professor of Entomology, Kansas State Agricultural College, Manhattan, Kan., as "State Nursery Inspector."

KENTUCKY.—Nurseries are inspected annually. Every package shipped into the State must be labelled with name of consignee, name of consignor, statement of contents, and a certificate of examination by a State or Government inspector. (Chapter 19, Laws of 1897.) Prof. H. Garman, State Entomologist, Lexington, Ky.

LOUISIANA.—Nursery stock shipped into the State must be labelled with a certificate of inspection. Shipments not so labelled shall be liable to confiscation. The entomologist has power to require any one in the State to fumigate trees and plants if deemed necessary. (Laws of 1904, and Circular No. 1). Mr. H. A. Morgan, Entomologist of the Crop Pest Commission, Baton Rouge, La.

MAINE.—The Commissioner of Agriculture may cause suspected premises to be inspected. Shipments into the State shall bear on each box or package a certificate that the contents have been inspected by an authorized inspecting officer, or each shipment must bear a formal affidavit that all stock sold by the consignor has been fumigated in a manner approved by the State inspector at the shipping point. Hon. A. W. Gilman, Commissioner of Agriculture, Augusta, Me. (Senate Bill No. 158, Laws of 1903.)

MARYLAND.—Nurseries inspected at least once in six months. All nursery stock subject to attack of insect pests must be fumigated under direction of State officials. Shipments into the State must be labelled with the name of consignor and consignee and each package bear a certificate of inspection. Duplicate certificates should be filed with the State Entomologist. (Chapter 289, Laws of 1898.) Prof. T. B. Symonds, State Entomologist; Prof. J. B. S. Norton, State Pathologist, College Park, Md.

MASSACHUSETTS.—Nurseries are inspected at least once each year, and if clean receive a certificate; instead thereof a nurseryman may fumigate his stock under the direction of the State inspector, using two-tenths of a gram of potassium cyanide to each cubic foot of space, under forty minutes exposure, and attach an affidavit of such fumigation to each package shipped. Shipments into the State must bear on each package a certificate of inspection by an authorized officer or an affidavit relative to fumigation, as above required. (Chapter 495, Laws of 1902.) Dr. T. H. Fernald, State Nursery Inspector, Amherst, Mass.

MICHIGAN.—Nurseries are subject to inspection; infested trees must be destroyed, and the remainder of the stock within a half mile must be fumigated. Shipments into the State must bear on every package, plainly labelled, the names of consignor and consignee, statement of contents, and a certificate showing that the contents have been inspected by a State or Government officer, that the stock has been properly fumigated. All nurserymen, whether residents of Michigan or other States, who wish to grow or sell stock within the State, must obtain a license from the State Board of Agriculture, for which the fee is $5, and a bond for $1,000 must be filed. A license will not be granted until a State or Government inspection certificate has been filed. (Laws of 1903.) Prof. L. R. Taft, State Inspector of Nurseries and Orchards, Agricultural College, Michigan.

MINNESOTA.—The State Entomologist shall inspect nurseries in the State when requested, or when he believes pests or disease exist. Shipments into the State must be accompanied by a certificate of inspection. (Act in force from June 1, 1903.) Mr. F. L. Washburn, State Entomologist, St. Anthony Park, Minn.

MISSISSIPPI.—No law. Prof. Glenn W. Herrick, Agricultural College, Miss.

MISSOURI.—Shipments into the State must be accompanied by certificate of inspection. (Laws of 1901.) Mr. J. M. Stedman, Entomologist, Agricultural Experiment Station, Columbia, Mo.

MONTANA.—All stock shipped into this State will be unpacked, inspected, and fumigated at designated quarantine stations. Notice shall precede all shipments. Mr. C. H. Edwards, Secretary, State Board of Horticulture, Butte, Mont.

NEBRASKA.—No law. State nurseries are inspected by Mr. Lawrence Bruner, Acting State Entomologist, Lincoln, Neb.

NEVADA.—No law. Mr. J. E. Stubbs, Director, Agricultural Experiment Station, Reno, Nev.

NEW HAMPSHIRE.—Nurseries are inspected at least once each year. Shipments into the State must be accompanied by a certificate of inspection or, in lieu thereof, a certificate of fumigation, with an affidavit that all stock has been fumigated in manner prescribed. Each car, box, and package shall be properly labelled. (Law, March 4, 1903.) Mr. Charles M. Weed, State Nursery Inspector, Durham, N. H.

NEW JERSEY.—The law requires the inspection of all nurseries at least once in each year. Shipments into the State must be accompanied by a certificate of inspection, or copy thereof, attached to each car or parcel, together with a statement from the shipper that the stock therein is a part of the stock inspected and whether such stock has been fumigated with hydrocyanic acid gas or not. (Chapter 249, Laws of 1903.) Dr. John B. Smith, State Entomologist, New Brunswick, N. J.

NEW MEXICO.—No law. Mr. Luther Foster, Director, Agricultural Experiment Station, Messilla Park, N. M.

NEW YORK.—All trees infested with dangerously injurious insects or affected with a serious fungous disease must be destroyed. Stock shipped in from other States must be fumigated before planting, sale, or distribution. If grown within one-half mile of a section infested with San Jose Scale, it must be fumigated before shipment or delivery. All stock intended for shipment must be accompanied by certificate. Fumigated stock must have the nurseryman's certificate that the fumigation has been carried out in a proper manner. (Section 83 of Agricultural Law.) Charles A. Wieting, Commissioner, Albany.

NORTH CAROLINA.—The regulations in this State have been revised and the tag system abolished. Nurseries are inspected annually; shipments must have duplicate certificates of inspection attached, and must be fumigated shortly before made. Shipments into the State must have a copy of a certificate of inspection; it is desired that the stock shall have been first fumigated, and a certificate of the consignee to that effect attached. Duplicate certificates must be filed with Mr. Franklin Sherman, Jr., State Entomologist, Raleigh, N. C.

NORTH DAKOTA.—No law. Dr. J. H. Worst, North Dakota Agricultural College, Agricultural College, N. D.

OHIO.—Nurseries are inspected each year, or oftener if necessary. Every package of nursery stock shipped into the State must be labelled with the names of the consignor and consignee, and a certificate showing that the contents have been inspected or fumigated by a State or Government officer. Agents must file a sworn statement with the chief inspector that the stock sold by them is covered by an official certificate before delivering the same. Blanks for statement will be furnished. Provision is made for issuing official certificates of fumigation to the nurserymen of the State. (Laws of 1904.) Mr. A. F. Burgess, Chief Inspector, Ohio Department of Agriculture, Columbus, O.

OKLAHOMA.—No law. Mr. John Fields, Director, Agricultural Experiment Station, Stillwater, Okla.

OREGON.—Stock on arrival is subject to inspection at specified quarantine stations. George H. Lamberson, Secretary, State Board of Horticulture, Portland, Ore.

PENNSYLVANIA.—Nurseries are inspected each year. Each shipment into the State must be labelled with the name of consignor and consignee and a certificate showing that the contents have been inspected by a State or Government officer. (Chapter 257, Laws of 1901.) Hon. N. B. Critchfield, Secretary of Agriculture, Harrisburg, Pa.; Mr. Enos B. Engle, Inspector, Harrisburg, Pa.

SOUTH CAROLINA.—Nurseries must be inspected annually, and it is unlawful to sell or ship without a certificate. All persons outside the State must register a copy of their certificate of inspection, furnished by the authorized official of the State in which he resides, with the chairman of the board of entomology, which copy shall state that in addition to inspection the nursery stock has been fumigated under the direction of the official issuing the certificate. Upon the filing of the proper certificate as prescribed, any person outside the State dealing in nursery stock will receive official tags, one of which must be placed, together with a copy of his certificate of inspection, on each consignment of stock entering the State. (Circular 1, August, 1903.) Mr. Charles E. Chambliss, State Entomologist, Clemson College, S. C.

SOUTH DAKOTA.—No law. The State nurseries are inspected by Prof. D. A. Saunders, Agricultural Experiment Station Entomologist, Brookings, S. D.

TENNESSEE.—Certificates must accompany shipments into the State. Prof. George W. Martin, State Entomologist, Nashville, Tenn.

TEXAS.—No law. Mr. E. Dwight Sanderson, State Entomologist, College Station, Texas.

UTAH.—Shipments into this State must be accompanied by a certificate that the stock has been properly fumigated before shipment. (Chapter 104, Laws of 1903.) State Board of Horticulture, Salt Lake City, Utah.

VERMONT.—No law. When State nurserymen ask for it, inspection will be done by the horticultural department of the University of Vermont and State Agricultural College. Prof. William Stuart, Burlington, Vt.

VIRGINIA.—Nurseries are inspected at least once each year. Unlawful for any person to sell or deliver any nursery stock unless he shall first procure from the Auditor of Public Accounts, Richmond, Va., a certificate of registration, which certificate shall contain such rules and regulations concerning the sale of nursery stock as the Board of Crop Pest Commissioners may prescribe. Registration fee is $20 for principals, with duplicates for agents free. Duplicate certificates must be filed with the Board, and stock entering the State must be accompanied by an official tag, which may be obtained of the State Entomologist after the duplicate has been filed. (Law of 1903.) Mr. J. L. Phillips, State Entomologist, Blacksburg, Va.

WASHINGTON.—"Any person, firm or corporation, agent or solicitor, to engage in the business of selling nursery stock" shall apply to the Commissioner of Horticulture, file a $2,000 bond, and pay a license fee of $5 for nurserymen and dealers, and $2.50 for each agent's duplicate license, bienially. Shipments into the State must be preceded by a notice of intention to do so, and names of nurserymen and place of delivery must accompany such notice. (Law of 1903.)

Hon. A. Van Holderbeck, Commissioner of Horticulture, Tacoma, Wash.

West Virginia.—Every nurseryman or dealer employing agents, before having authority to do business in any county of the State, must take out a license in such county and pay the sheriff a license fee of $10; and the principal shall file with the clerk of the county court of each county in which he may have salesmen a list of his agents in said county. Nurseries are inspected annually. Shipments into the State must be accompanied by a certificate of inspection and also a certificate of fumigation. (Chapters 48 and 49, Laws of 1903.) Mr. J. H. Stewart, Director, Agricultural Experiment Station, Morgantown, W. Va.

Wisconsin.—Nurseries are inspected each year. Shipments into this State must have attached the certificate of inspection of a duly appointed State or Government officer. Shipments from the State should be accompanied by the official tags of the Director of the Agricultural Experiment Station. (Chapter 180, Laws of 1899.) Prof. E. P. Sandsten, Inspector, Agricultural Experiment Station, Madison, Wis.

Wyoming.—No law. Mr. B. C. Buffum, Director, Agricultural Experiment Station, Laramie, Wyo.

Canada.—Within the province of Ontario all nursery stock, except green-house plants, herbaceous perennials, herbaceous plants, conifers, bulbs, and tubers, must be fumigated before shipment.

Shipments into Canada must be addressed so as to enter Canada at one of the named points of entry, where the stock will be unpacked and fumigated by the authorities.

Ports of entry from March 15th to May 15th, in the spring, and October 7th to December 7th, in the autumn, are namely: St. John, N. B.; St. Johns, Quebec; Niagara Falls and Windsor, Ontario; Winnipeg, Man. During the winter months only, from October 15th to April 15th, at Vancouver, B. C. Dr. James Fletcher, Dominion Entomologist, Ottawa, Ontario.

Kingston, R. I., Jan. 1, 1905.

RETURNS OF SOCIETIES RECEIVING A BOUNTY FROM THE STATE.

RETURNS OF THE WASHINGTON COUNTY AGRICULTURAL SOCIETY, FOR THE YEAR ENDING NOVEMBER 1, 1904.

FINANCIAL STATEMENT.

Received from cash on hand at date of last report	$2,288 77
“ “ membership fees	70 00
“ “ sales of single admission tickets to fair	5,044 43
“ “ admissions to grand stand	903 30
“ “ entrance fees on trials of speed	322 50
“ “ rent of grounds for booths or other purposes	1,351 10
“ “ State appropriation	1,000 00
“ “ sale of grain	9 61
Total receipts	$10,989 71
Expended for running expenses of fair	$3,620 52
“ “ purses or premiums for trials of speed	1,442 50
“ “ all other premiums, gratuities, medals, or diplomas	1,972 30
“ “ permanent improvements	657 74
“ “ other expenditures	120 00
Cash on hand November 1, 1904, to balance	3,176 65
	$10,989 71

Indebtedness of society	$4,800 00
Value of real estate	15,000 00
Number of members	316
Total estimated attendance	20,000
Price of single admission tickets to the fair	50 cents.
Price of single admission tickets to grand stand	15c. & 25c.

FARM STOCK.

	Amount.	Number Exhibited.
Amount awarded for bulls	$77 00	19
" " " milch cows	189 00	156
" " " heifers	115 00	101
" " " calves	36 50	34
" " " working oxen (pairs)	87 00	32
" " " steers (pairs)	10 00	10
" " " fat cattle	.....	6
" " " horses (except speed)	101 00	48
" " " horses (speed)	1,655 00	39
" " " sheep	25 00	27
" " " swine	88 00	44
" " " poultry	266 00	377 pairs.
Total amount awarded for live stock	$2,649 50	

FARM PRODUCTS.

Amount awarded for Indian corn	$1 50
" " " wheat	1 50
" " " rye	75
" " " beans	2 75
" " " potatoes	17 25
" " " carrots	1 50
" " " beets	6 00
" " " turnips	25
" " " onions	8 50
" " " other root crops	31 75
Total amount awarded for grain and root crops	$91 75

MISCELLANEOUS.

Amount awarded for domestic manufactures	$61 00
" " " fine arts and fancy articles	90 40
" " " needlework	70 10
Number of diplomas awarded	1
" people who received premiums	530
Special grange premiums	150

ROWLAND G. HAZARD, President, Peace Dale, R. I.
JOHN A. ALLEN, Secretary, Peace Dale, R. I.
JESSE V. B. WATSON, Treasurer, Wakefield, R. I.

RETURNS OF THE NEWPORT HORTICULTURAL SOCIETY, FOR THE YEAR ENDING DECEMBER 1, 1904.

FINANCIAL STATEMENT.

Received from cash on hand at date of last report	$41 25
" " membership fees and dues	465 50
" " sales of single admission tickets to fair	385 25
" " donations or subscriptions	100 00
" " State appropriation	750 00
" " interest	51
Total receipts	$1,742 51
Expended for running expenses of fair	$390 59
" " premiums, medals, or diplomas	51 00
" " gratuities	766 50
" " other expenditures	433 41
Cash on hand December 1, 1904, to balance	101 01
Total	$1,742 51
Number of members	168
Total estimated attendance: 1,461 paid; 800 free	2,261
Price of single admission tickets to the fair	25 cents.

FARM PRODUCTS.

Amount awarded for root crops and vegetables	$125 00
" " " fruits	128 00
" " " flowers and plants	413 50
" " " any other cultivated crops	100 00
Total amount awarded under the head of farm products	$766 50
Amount awarded for fruits	$104 00
" " " flowers	83 00
" " " butter	6 00
" " " honey and wax	9 50
" " " bread, cake, and pies	29 50
" " " preserved fruits, etc	28 25
Total amount awarded under the head of farm products	$260 25

MISCELLANEOUS.

Number of medals awarded—silver, 11	$66 00
" " " —bronze, 4	16 00
" certificates of merit	18
" people who received premiums	68

James J. Sullivan, President, 25 Carey Street, Newport, R. I.
David McIntosh, Secretary, Ledge Road, Newport, R. I.
A. K. McMahon, Treasurer, 13 Bliss Road, Newport, R. I.

RETURNS OF THE NEWPORT COUNTY AGRICULTURAL SOCIETY, FOR THE YEAR ENDING DECEMBER 1, 1904.

FINANCIAL STATEMENT.

Received from cash on hand at date of last report	$627 46
" " sales of single admission tickets to fair	759 80
" " donations or subscriptions	74 00
" " rent of grounds for booths or other purposes	154 00
" " State appropriation	1,000 00
" " advertisements in book	180 00
" " commission on sales	38 73
Total receipts	$2,833 99
Expended for running expenses of fair	$199 29
" " all other premiums, gratuities, medals or diplomas	1,093 85
" " permanent improvements	700 00
Paid on note	700 00
Cash on hand December 1, 1904, to balance	140 85
Total	$2,833 99
Indebtedness of society	$600 00
Value of real estate	3,200 00
Value of personal estate	60 00
Number of members	52
Total estimated attendance	5,000
Price of single admission tickets to the fair	25 cents.

How is the personal estate invested or of what does it consist?

Chairs, canvas, etc.

FARM STOCK.

Amount awarded for bulls	$20 00
" " " milch cows	34 00
" " " heifers	16 00
" " " calves	15 00
" " " working oxen (pairs)	15 00
" " " steers (pairs)	6 00
" " " fat cattle	13 00
" " " sheep	16 00

Amount awarded for swine	$42 00
" " " poultry	87 00
Total amount awarded for live stock	$264 00

FARM PRODUCTS.

Amount awarded for Indian corn	$20 00
" " " beans	4 50
" " " potatoes	40 00
" " " carrots	5 50
" " " beets	4 00
" " " parsnips	1 00
" " " turnips	1 00
" " " onions	15 00
" " " other root crops	90 35
Total amount awarded for grain and root crops	$181 35
Amount awarded for fruits	$132 00
" " " flowers	59 00
" " " butter	3 50
" " " honey and wax	1 00
" " " bread and cake	23 00
" " " preserved fruits, etc	87 00
Total amount awarded under the head of farm products	$486 85

MISCELLANEOUS.

Amount awarded to granges	$30 00
Amount awarded to mechanical inventions, domestic manufactures, etc., not specified above	65 00
Amount awarded to fine arts and fancy articles	38 00
" " " needlework	162 00
Number of people who received premiums	321
Amount awarded to school work	$44 00

Isaac L. Sherman, President, Melville Station, Newport, R. I.
Alton F. Coggeshall, Secretary, Melville Station, Newport, R. I.
Edward R. Anthony, Treasurer, Portsmouth, R. I.

RETURNS OF THE R. I. POULTRY ASSOCIATION, FOR THE YEAR ENDING DECEMBER 31, 1904.

FINANCIAL STATEMENT.

Received from cash on hand at date of last report	$74 22
“ “ membership fees	77 00
“ “ sales of single admission tickets to fair	458 70
“ “ donations or subscription	152 35
“ “ all other entrance fees	550 92
“ “ rent of grounds for booths or other purposes	127 00
“ “ State appropriation	1,000 00
“ “ catalogues	31 55
Total receipts	$2,471 74

Expended for running expenses of fair	$1,106 47
“ “ premiums, gratuities, medals, or diplomas	1,150 05
“ “ other expenditures	100 00
Cash on hand December 31, 1904, to balance	115 22
	$2,471 74

Indebtedness of society	$416 76
Value of personal estate	181 00
Number of members	47
Total estimated attendance	2,300
Price of single admission tickets to the fair	25c. & 15c.

How is the personal estate invested or of what does it consist?

Exhibition coops.

FARM PRODUCTS.

Amount awarded for poultry and other stock	$1,150 05

MISCELLANEOUS.

Number of cups awarded	3
“ people who received premiums	113

GEO. W. WILLIAMS, President, Providence, R. I.
W. I. BROWN, Secretary, Providence, R. I.
W. H. CONGDON, Treasurer, Oak Lawn, R. I.

RETURNS OF THE R. I. HORTICULTURAL SOCIETY, FOR THE YEAR ENDING DECEMBER 1, 1904.

FINANCIAL STATEMENT.

Received from cash on hand, December 31, 1903	$390 21
" " membership fees	248 00
" " single admission tickets to fairs	77 35
" " State appropriation	1,000 00
" " interest on invested funds	116 84
Total receipts	$1,832 40
Expended for running expenses of fairs	$405 40
" " all other premiums, gratuities, medals or diplomas	1,225 00
" " all other expenditures	76 55
Cash on hand January 1, 1905, to balance	125 45
Total	$1,832 40
Value of personal estate	$2,871 40
Number of members	300
Total estimated attendance	2,000
Price of single admission tickets to the fairs	25 cents.

How is the personal estate invested or of what does it consist?

Manufacturers Trust Company.
Industrial Trust Company.
Ordinary fixtures for holding fairs.

MISCELLANEOUS.

Number of medals awarded	3
" diplomas awarded	10
" people who received premiums (estimated)	300

Marcus M. Burdick, President, Linwood Avenue, Providence.

Charles W. Smith, Secretary and Treasurer, 27–29 Exchange Street, Providence.

RHODE ISLAND STATE GRANGE.

OFFICIAL DIRECTORY, 1904.

OFFICERS OF THE NATIONAL GRANGE.

Master.—Aaron Jones	South Bend, Ind.
Lecturer.—N. J. Bachelder	Concord, N. H.
Treasurer.—Mrs. Eva McDowell	Rome, N. Y.
Secretary.—C. M. Freeman	Tippecanoe City, O.

OFFICERS OF THE RHODE ISLAND STATE GRANGE.

Master.—Frank E. Marchant	West Kingston.
Lecturer.—Theo. S. Snow	P. O. Box 400, Wakefield.
Treasurer.—Benj. Martin	East Providence.
Secretary.—A. F. Coggeshall	Melville Station, Newport.

Annual Meeting, Second Wednesday in December.

EXECUTIVE COMMITTEE.

I. L. Sherman	Melville Station, Newport.
D. S. Bushee	Warren.
F. W. Voelker	Arnold Mills.
F. E. Marchant, *ex-officio*	West Kingston.
A. F. Coggeshall, *ex-officio*	Melville Station, Newport.

DEPUTIES.

Providence County.—Mrs. Hattie S. Voelker	Arnold Mills.
Washington County.—Mrs. Rosalind Arnold	Davisville.
Kent County.—C. R. Magoon	East Greenwich.
Newport and Bristol Counties.—A. F. Maker	Warren.

POMONA GRANGE OFFICERS.

Providence County, No. 1.

Master.—E. F. Crowinshield .... Abbot Run.
Lecturer.—Mrs. John S. Olney .... Lonsdale.
Secretary.—Jennie E. Weatherhead .... Ashton.

Meets second Tuesdays in February, April, June, August, October, and December, by appointment.

Washington County, No. 2.

Master.—Lyman Aylesworth .... East Greenwich.
Lecturer.—Mrs. Rosalind R. Arnold .... Davisville.
Secretary.—Wendell Phillips .... Wyoming.

Meets by appointment, second Tuesdays in February, April, June, August, October, and third Tuesday in December.

Kent County, No. 3.

Master.—Charles R. Magoon .... East Greenwich.
Lecturer.—Mrs. M. A. Magoon .... East Greenwich.
Secretary.—Mrs. Betsie A. Spears .... Foster Centre.

Meets by appointment, second Thursdays in January, March, May, September, and November.

Newport County, No. 4.

Master.—William H. Potter .... Tiverton Four Corners.
Lecturer.—Mrs. J. Oscar Peckham .... Middletown.
Secretary.—Mrs. Jason W. Gifford .... Tiverton.

Meets by appointment, third Tuesdays in alternate months, commencing with February.

OFFICERS OF SUBORDINATE GRANGES.

Narragansett, No. 1.

Master.—Theo. S. Snow .... Wakefield.
Lecturer.—Mrs. Lillian E. Holley .... Peacedale.
Secretary.—T. T. Tucker .... Narragansett Pier.

Meets in Columbia Hall, Wakefield, fourth Tuesday in each month at 1 P. M., October to April; rest of the year at 2 P. M.

CUMBERLAND, No. 2.

Master.—F. W. Voelker .... Arnold Mills.
Lecturer.—Louis G. K. Clarner, Jr., ... Arnold Mills.
Secretary.—Mrs. Susan F. Whipple .... Diamond Hill.

Meets first and third Thursdays in each month at Grange Hall, Arnold Mills.

BORDER, No. 3.

Master.—Mrs. Carrie Smith Beauregard .... Woonsocket.
Lecturer.—Mrs. Bertha E. Darling .... Woonsocket.
Secretary.—Miss Kathryn F. Allen .... Woonsocket.

Meets first and third Wednesday evenings in each month, Grange Hall, East Woonsocket.

BURRILLVILLE, No. 4.

Master.—Sayles B. Steere .... Chepachet.
Lecturer.—Bert C. Smith .... Tarkiln.
Secretary.—Elizabeth A. Thayer .... Harrisville.

Meets first and third Tuesday evenings of each month at Wood's Hall, Harrisville.

HOPE VALLEY, No. 7.

Master.—Orville M. Meserve .... Hope Valley.
Lecturer.—L. Alice James .... Wyoming.
Secretary.—Wendell Phillips .... Wyoming.

Meets first and third Saturday evenings of each month at Wincheck Hall, Hope Valley.

DAVISVILLE, No. 8.

Master.—Arnold H. Tefft .... Davisville.
Lecturer.—Mrs. Seth C. Mason .... East Greenwich.
Secretary.—Mrs. Bertha M. Spooner .... East Greenwich.

Meets Wednesday evenings on or before the full moon of each month, at Grange Hall, North Kingston, near Davisville.

PRIMROSE, No. 9.

Master.—Albert E. Tood .... P. O. Box 44, Woonsocket.
Lecturer.—Mrs. Lewis W. Follett .... Woonsocket.
Secretary.—Mrs. David C. Todd .... Woonsocket.

Meets every Tuesday evening in Temperance Hall, North Smithfield.

WEST KINGSTON, No. 10.

Master.—John G. Clarke.................................West Kingston.
Lecturer.—Lucy C. Tucker.................................Kingston.
Secretary.—Howland Burdick.................................Kingston.

Meets in Lippitt Hall, at Rhode Island Agricultural College, Kingston, on second and fourth Saturday evenings, at 8 P. M.

EXETER, No. 12.

Master.—Edward P. Dutemple.................................Exeter.
Lecturer.—Annie O. Knight.................................Liberty.
Secretary.—Martha A. Gardner.................................Slocum.

Meets first and third Thursday evenings of each month in Odd Fellows Hall, Fisherville.

UNION, No. 13.

Master.—Myron O. Aldrich.................................Woonsocket.
Lecturer.—Clara E. Marsh.................................
Secretary.—Ellen Mrash.................................Slatersville.

Meets by appointment at the homes of members.

SUMMIT, No. 15.

Master.—B. H. Nixon.................................Summit.
Lecturer.—L. J. Winsor.................................Summit.
Secretary.—B. F. Hall.................................Summit.

Meets in Grange Hall, first and third Saturday evenings.

WESTERLY, No. 18.

Master.—William F. Saunders.................................Westerly.
Lecturer...William P. Browning.................................Westerly.
Secretary.—Mrs. T. D. Babcock.....................P. O. Box 411, Westerly.

Meets by appointment, first and third Tuesdays, at 2 P. M.

ROGER WILLIAMS, No. 19.

Master.—Benj. Martin.....................23 Martin Street, East Providence.
Lecturer.—Mrs. Seth Wood.....................Warren Avenue, East Providence.
Secretary.—Miss Maria E. Martin............23 Martin Street, East Providence.

Meets alternate Friday evenings.

LIME ROCK, No. 22.

Master.—John S. Olney..Lonsdale.
Lecturer.—Thomas A. Perigree....................16 High Street, Pawtucket.
Secretary.—Mrs. E. A. Knight..................594 River Road, Saylesville.

Meets second and fourth Friday evenings of each month in Grange Hall, Lime Rock.

KICKEMUIT, No. 24.

Master.—Daniel S. Bushee..Warren.
Lecturer.—Alvertur Martin..........................Vernon Street, Warren.
Secretary.—Miss Louise Mason....................................Warren.

Meets in Grange Hall, second and fourth Friday evenings of each month.

MOOSUP VALLEY, No. 26.

Master.—John E. Dawley..Greene.
Lecturer.—Mrs. A. A. Kennedy....................................Greene.
Secretary.—Mrs. Ida Dawley..Greene.

Meets first and third Wednesday evenings of each month at Moosup Valley Church.

ROCKY HILL, No. 27.

Master.—George W. Godfrey..............................East Greenwich.
Lecturer.—Charles R. Magoon..............................East Greenwich.
Secretary.—Mrs. Ida E. Godfrey..........................East Greenwich.

Meets first and third Thursday evenings of each month at Rocky Hill Chapel.

PORTSMOUTH, No. 29.

Master.—B. Earl Anthony........................Melville Station, Newport.
Lecturer.—Miss Phœbe A. Coggeshall..............Melville Station, Newport.
Secretary.—Miss Clara L. Coggeshall...............Melville Station, Newport.

Meets first and third Thursday evenings of each month at Agricultural Hall, Portsmouth.

AQUIDNECK, No. 30.

Master.—Nathaniel L. Champlin, Jr................Melville Station, Newport.
Lecturer.—Mrs. J. Oscar Peckham..............................Middletown.
Secretary.—Lewis R. Manchester..................Melville Station, Newport.

Meets second and fourth Thursday evenings of each month at Middletown Town Hall.

NONQUIT, No. 31.

Master.—Mrs. F. A. Wilcox..................................Tiverton.
Lecturer.—Mrs. John A. Hathaway..........................Tiverton.
Secretary.—Miss Clover L. Hambly..........................Tiverton.

Meets second and fourth Wednesday evenings of each month at Grange Hall, Tiverton Four Corners.

LITTLE COMPTON, No. 32.

Master.—P. H. Wilbur...Little Compton.
Lecturer.—Grace R. Wilbur..................................Little Compton.
Secretary.—Mary L. Wilbur..................................Little Compton.

Meets first and third Wednesday evenings of each month at Grange Hall.

MISCELLANEOUS FACTS AND FIGURES.

William Blackstone, first white settler (1634) in Rhode Island.
Roger Williams settled Providence, June, 1636.
Area of State, 1,054 square miles.
Area with Narragansett Bay, 1,300 square miles.
Area Bristol county, 34 square miles.
Area Kent county, 169 square miles.
Area Newport county, 117 square miles.
Area Providence county, 411 square miles.
Area Washington county, 332 square miles.
Greatest length of State, 48 miles.
Greatest width, 37 miles.
Coast line, 400 miles.
Number of cities, 5.
Number of towns, 32.
Population of the State, 428,856.
Gain in population in ten years, 44,098.
Population of Providence, 175,597.
Population of Pawtucket, 39, 231.
Population of Woonsocket, 28,204.
Population of Newport, 21,537.
Population of Bristol county, 13,144.
Population of Kent county, 29,976.
Population of Newport county, 32,599.
Population of Providence county, 328,683.
Population of Washington county, 24,154.
Smallest town in area, North Providence, 5.5 square miles.
Largest town in area, South Kingstown, 77.9 square miles.

Area city of Providence, 18.286 square miles.
Highest land in the State, Durfee Hill, Glocester, 805 feet.
Total indebtedness of cities, $25,478,729.99.
Total indebtedness of towns, $3,632,478.54.
Highest rate of taxation in towns, $1.28 per $100.
Lowest rate of taxation in towns, $.60 per $100.
Town and city valuation, real, 1901, $327,201,068.
Town and city valuation, personal, 1901, $86,008,535.
Number of post-offices in the State, 177.
Money order offices, 129.
Representatives in Congress, 4.
Number of schoolhouses in the State, 530.
Number of schools in the State, 1,252.
Number of teachers employed, 1,625.
Number of pupils, 45,308.
Estimated value of school property, $5,293,488.
Number of public libraries in the State, 49.
Number of volumes, 189,420.
Militia force in the State, 1,453 men.
Inmates of State institutions, 2,262.
Latitude of Providence, 41° 49′ 26″.
Longitude of Providence, 71° 24′ 20″.
Difference in time between Providence and Washington, 22 minutes, 35 seconds.
Difference in time between Providence and Boston, 1 minute, 21 seconds.
Number of farms in the State, 6,441.
Number of farmers, 5,577.
Acreage of farms, 479,690.
Neglected (called abandoned) farms, 386.
Neglected farms with buildings, 103.
Neglected farms, acreage, 34,571.
Neglected farms, assessed valuation, $366,325.
Neglected farms, estimated value per acre, $2 to $30.

Number of farms encumbered, 786.
Value of farms encumbered, $2,814,715.
Amount of encumbrance, $1,198,726.
Percentage of encumbrance of value, 42.59.
Farms owned, per cent., 75.
Farms hired, per cent., 25.
Farms free of encumbrance, per cent., 80.95.
Farms encumbered, per cent., 19.05.
Average value of encumbered farms, $3,581.
Average encumbrance, $1,525.
Average annual interest, $89.
Average rate of interest, $5.82.
Capital invested in agricultural property, $30,859,698.
Value of annual product, $6,476,248.
Rhode Island men in the Rebellion, 24,102.
Rhode Island men killed or died in the Rebellion, 2,769.
Rhode Island war expenditure, $6,500,772.
Cider mills in the State, 111.
Square feet of glass in greenhouses, 1,210,165.
Varieties of native trees and shrubs in the State, 152.
Species of birds in the State, 296.
Species of trees in the State, 46.
Assembly meets, January.
Legal holidays, February 22, May 30, July 4, Thanksgiving, Christmas, election days.
Dams in the State, 441.
Tonnage of the port of Providence, 34,329 tons.
Customs districts in the State, 3.
State Board of Agriculture, instituted 1885.
State senators, one for each city or town, 37.
Representatives, one for each 1,530 inhabitants, 72.
Cotton spindles in the State, 2,044,534.

ABSTRACT OF LAWS RELATIVE TO AGRICULTURE.

SECTION 1. The Rhode Island state board of agriculture shall be constituted as follows: the governor, lieutenant-governor, and secretary of state shall be *ex-officio* members of said board; one member shall be appointed from and by the board of managers of the Rhode Island College of Agriculture and Mechanic Arts; one member shall be oppointed from and by each of the agricultural societies which receive an annual bounty from the state; one member shall be appointed by and from the Rhode Island State Grange, Patrons of Husbandry; and three members shall be appointed by the governor with the advice and consent of the senate. Of the members so appointed by the governor at least one shall be a resident of Providence county. **State board of agriculture.**

SEC. 2. The members of said board hereafter appointed by the agricultural societies or grange named in section 1 of this chapter shall hold their offices until the first day of February in the second year after their appointment. Any vacancy which may occur in their number shall be filled for the unexpired term in the manner provided for making the original appointment. At the January session of the general assembly in each year the governor, with the advice and consent of the senate, shall appoint some persons to be members of said board to succeed the members whose terms will next expire; and the members so appointed shall hold their offices until the first day of February in the second year after their appointment. Any vacancy which occurs in their number when the senate is not in session shall be filled by the governor until the next session thereof, when he shall, with the advice and consent of the senate, appoint some person to fill such vacancy for the remainder of the term. The members of said board now in office shall continue to hold their offices for the remainder of the terms for which they were respectively appointed. **Same subject.**

SEC. 3. The board shall meet at least twice in each year at the state house in Providence, and may meet at such other times and places as may be deemed expedient. It shall be the duty of the board to look after the agricultural interests of the state, the promotion of agricultural education, and the general interests of husbandry throughout the state. The board **Meetings and duties of the board.**

may cause to be analyzed samples of such commercial fertilizers as may from time to time be offered for sale in this state, and may collect and distribute such seeds, plants, shrubs, and trees as may be in their power to procure from all sources. They may also take, hold in trust, and exercise control over donations or bequests for promoting agricultural education for the general interests of agriculture.

Agricultural institutes.

SEC. 4. The board shall hold ~~one~~ agricultural institute in each county annually, either independently or in connection with any society, association, or other organization devoted to the same general objects, and may hold as many more as it shall deem expedient, and shall, as far as may be practicable, encourage state and local associations and societies in the interests of agriculture.

Secretary of the board.

Expenses of the board.

SEC. 5. The board may appoint and prescribe the duties of a secretary, who shall receive for his services, out of the appropriation for the use of the board, such sum as the board may direct, and also his necessary expenses while traveling by direction of the board. No member of the board shall receive any compensation for his services as such, but shall be entitled to receive such expenses as are necessarily incurred in the legitimate discharge of his duties.

What societies to make annual returns.

SEC. 6. Every agricultural and kindred society receiving a bounty from the state shall make an annual return to the state board of agriculture during the month of December in each year, on such matters and in such form as shall be prescribed by said board; and any society neglecting to comply with the requirements of the board shall not be entitled to the allowance from the state, as by law now provided, for the ensuing year.

Annual report of the board, and how to be distributed.

SEC. 7. The board shall report annually, to the general assembly, at its January session. Two thousand copies of its report shall be printed by the state printers under contract to the state. The board shall distribute one copy of the report to each member of the general assembly, one to the town clerk of each town in the state for the use of the town, one to each public library, and a proper number to the agricultural school and experiment station, agricultural societies, farmers' clubs, and granges in the state, and shall make such exchanges with other like organizations as may be deemed expedient. The board may cause to be printed and distributed from time to time, in pamphlet form, such analyses of commerical fertilizers, and such other information, as the interests of agriculture may require.

Cattle commissioners.

SEC. 8. The board may appoint one cattle commissioner in each county of the state, whose duty it shall be to visit and inquire into the condition of any domestic animal in their respective counties whenever there is reason to suspect that any such animal, or the carcass of any such animal, is affected with tuberculosis or other contagious, infectious, or communicable disease; and the commissioners in their respective counties are authorized to quarantine any such animal, or the carcass of any such animal, until inspected by the veterinarian employed by the board.

Veterinarians.

SEC. 9. The board may employ veterinary surgeons.

SEC. 10. Whenever any animal shall be suspected by either of the cattle commissioners to be affected with tuberculosis, the commissioner of the county where the animal is found shall immediately notify the secretary of the state board of agriculture, who shall promptly fix a day when the commissioner duly appointed, as hereinbefore provided, shall visit the suspected animal with the veterinarian; and upon confirmation of the disease, and after appraisement of the value, as hereinafter provided, the affected animal shall be killed, and the carcass disposed of in such a manner as will not be detrimental to the public health. Anyone having reason to suspect that any horse or other animal is affected with glanders, farcy, or any contagious or communicable disease, shall immediately report the same to the secretary of the state board of agriculture, who shall notify the veterinarian employed by the board, and said veterinarian shall promptly examine the suspected animal, and if it is found to be affected with glanders, farcy, or any contagious or communicable disease, or suspected to be so affected, the veterinarian shall cause the said animal to be killed and the carcass to be disposed of in such manner as shall not be detrimental to the public health. Whenever either of the cattle commissioners shall find an animal which is suffering, or supposed to be suffering, from tuberculosis, and to the best of their judgment said animal cannot live until the veterinarian employed by the board shall arrive, said commissioners shall have the power to slaughter said animal, if the owner shall agree to have it slaughtered at owner's risk, and if upon a post-mortem examination it shall be found that the slaughtered animal was affected with tuberculosis, then the animal so killed shall be paid for as is hereinafter provided. If, on the other hand, said animal proves to be free from tuberculosis, the state shall not be liable for indemnity.

SEC. 11. For the purposes aforesaid the veterinarian, with one of the cattle commissioners in each county, shall constitute the board of appraisers for said county, and the estimate of value by such two persons shall be final: *Provided*, that not more than fifty dollars shall be allowed for any single native animal, nor more than seventy-five dollars for any single grade animal, nor more than one hundred dollars for any single registered animal, and written notice of the amount of the appraisal, signed by the board of appraisers, shall be immediately given to the owner or claimant of said animal; *and provided, further*, that any party aggrieved by any award made under the provisions of this section may appeal therefrom to said board within five days after the receipt of said notice.

SEC. 12. The board of appraisers is hereby authorized to quarantine any animal or animals supposed to be affected with a contagious, infectious, or communicable disease, and one-third of the cost of such quarantining shall be assumed and paid by the state, except as otherwise provided in section 30 of this chapter.

SEC. 13. The state shall pay to the owner of any tuberculous animal killed under the provisions of section 10 of this act one-half of its appraised value; but if upon post-mortem examination it shall be found that the slaughtered animal was not affected with tuberculosis, then the animal so killed shall be paid for at its appraised value: *Provided*, that the state shall not pay for any diseased animal so killed if the animal has not been owned by some person in the state and found in the state three months previous to the day of slaughter. It shall be the duty of the cattle commissioners of the several counties to demand of the owner of the animal or animals killed under section 10 of this chapter that the premises where the diseased animal or animals have been kept shall be thoroughly cleansed and disinfected to the satisfaction of the cattle commissioners of their respective counties, and the board shall direct what said cleansing and disinfecting shall consist of.

Penalty for concealing tuberculosis.

SEC. 14. When any person shall be shown to have knowingly brought into this state an animal suffering, or suspected to be suffering, with tuberculosis, or to have concealed the existence of such disease in any animal owned by him, such person shall not be entitled to any compensation for the animal slaughtered under this chapter, and shall be deemed guilty of a misdemeanor, and upon conviction shall be fined for such offence not exceeding one hundred dollars.

Animals affected by pleuro-pneumonia, or glanders, or farcy, to be reported.

SEC. 15. All persons having knowledge or reasons to suspect that any neat cattle or bovine animal has the contagious pleuro-pneumonia, or Texas cattle-fever, or that any horse has glanders or farcy, or that any bovine animal or horse has any other highly contagious, infectious, or communicable disease dangerous to public health, shall make report concerning the same by mail or otherwise to the secretary of the state board of agriculture immediately, giving the name of the owner or custodian of the said animal or animals, and the place of keeping the same.

SEC. 16. No person having the care or custody of any animal having any one of the diseases mentioned in the preceding sections shall, know-

Penalty for sale, etc., of diseased animal.

ing the same to have any such disease, sell or exchange, or permit the removal, use, or driving of the same upon any public highway, or the exposure of the same to contact with any other healthy animal of the same kind except by permission of some member or agent of the state board of agriculture. Any person so doing shall be deemed guilty of a misdemeanor, and on being convicted shall be fined not exceeding one hundred dollars.

Members of board may enter premises.

Sec. 17. The state board of agriculture, or its duly authorized representatives, having reason to suspect the existence of any of the diseases mentioned in this chapter upon any grounds or premises, are hereby authorized and empowered to enter upon such grounds or premises for the enforcement of the provisions of this chapter.

Governor to accept rules made under the national law.

Sec. 18. The governor is hereby authorized to accept on behalf of the state the rules and regulations prepared by the commissioner of agriculture under and in pursuance of section three of an act of congress approved May 29, 1884, entitled "An act for the establishment of a bureau of animal industry, to prevent the exportation of diseased cattle, and to provide means for the suppression and extirpation of pleuro-pneumonia and other contagious diseases among domestic animals," and to co-operate with the authorities of the United States in the provisions of said act.

Sec. 19. The inspectors of the ~~bureau of animal industry~~ U S Dept of Agric of the United States, in co-operation with the state board of agriculture or with any agent of the state board of agriculture, shall have the right of inspection, quarantine, and condemnation of animals affected with any contagious, infectious, or communicable disease, or suspected to be so affected, or that have been exposed to any such disease, and for these purposes are hereby authorized and empowered to enter upon any grounds or premises. Said inspectors, in co-operation with the state board of agriculture, or with any agent of the state board of agriculture, shall have the power to call on sheriffs, constables, and peace officers to assist them in the discharge of their duties in carrying out the provisions of the act of congress, approved May 29th, 1884, establishing the bureau of animal industry or the provisions of the board of agriculture, and it is hereby made the duty of sheriffs, constables, and peace officers to assist said inspectors or agents when so requested; and said inspectors or agents shall have the same power and protection as peace officers while engaged in the discharge of their duties.

State not liable under sections 18, 19.

Sec. 20. The state shall not be liable for any damages or expenses incurred under sections eighteen and nineteen of this chapter.

Penalties.

Sec. 21. Any person or persons who shall willfully or intentionally interfere with any officer or officers, duly authorized to carry out the provisions of this chapter, or who shall willfully or intentionally violate the provisions of the quarantine authorized by section twelve of this chapter, shall be deemed guilty of a misdemeanor, and upon conviction shall be liable to imprisonment not exceeding three months, or a fine not exceeding one hundred dollars, or both, at the discretion of the court.

Compensation.

SEC. 22. The state board of agriculture is hereby authorized to fix the compensation of the cattle commissioners and veterinary surgeons, to prescribe their duties, and to remove them when deemed expedient so to do.

Monthly report.

SEC. 23. The secretary of the state board of agriculture shall make a monthly report to the governor, of the obligations of the state board of agriculture; and the state auditor is hereby directed to draw his orders on the general treasurer for the payment of the same upon vouchers approved by the governor.

Prosecutions are to be commenced within sixty days.

SEC. 24. All prosecutions for offences against the provisions of this chapter shall be commenced within sixty days after the same shall have been committed, and not afterwards.

Passed March 1, 1898.

RHODE ISLAND FERTILIZER LAW AS AMENDED MARCH 1, 1898, AND IN FORCE ON AND AFTER JULY 1, 1898.

SECTION 1. Every lot or parcel of commercial fertilizer, or material used for manurial purposes, sold, offered, or exposed for sale within this state, the retail price of which is ten dollars or more per ton, shall be accompanied by a plainly printed label stating clearly and truly the number of net pounds of fertilizer in the package, the name, brand, or trade-mark under which the fertilizer is sold, the name and address of the manufacturer or importer, the place of manufacture, and a chemical analysis stating the percentage of nitrogen, of potash ($K_2 O$) soluble in distilled water, and of soluble, reverted, and insoluble phosphoric acid ($P_2 O_5$). Whenever any fertilizer or fertilizing ingredients are shipped or sold in bulk, for use by farmers in this state, a statement must be sent to the board of managers of the Rhode Island College of Agriculture and Mechanic Arts, giving the name of the goods so shipped. and accompanied by an affidavit from the seller giving the percentage of the several ingredients guaranteed. All fertilizers sold, offered, or exposed for sale for less than ten dollars per ton shall be accompanied by a label giving a correct general statement of the composition and ingredients of the same.

SEC. 2. Before any commercial fertilizer, the retail price of which is ten dollars or more per ton, is sold, offered, or exposed for sale. the importer, manufacturer, or party who causes it to be sold or offered for sale within the state shall file with the board of managers of the Rhode Island College of Agriculture and Mechanic Arts a certified copy of the statement named in section 1 of this chapter, and a list of the names and addresses of his agents in this state, and also deposit with said board of managers, at their request, a sealed glass jar or bottle containing not less than one pound of the fertilizer, accompanied by an affidavit that it is a fair average sample thereof.

SEC. 3. The manufacturer, importer, agent, or seller of any brand of commercial fertilizer, or material used for manurial purposes, the retail price of which is ten dollars or more per ton, shall pay on or before the first day of April, annually, to the treasurer of the state of Rhode Island, an analysis fee of six dollars for each of the fertilizing ingredients contained or claimed to exist in said fertilizer to be sold, offered, or exposed for sale within this state as aforesaid: *Provided, however,* that whenever the manufacturer or importer shall have paid the fee herein required for any person acting as agent or seller for such manufacturer or importer, such agent or seller shall not be required to pay the fee named in this section; and on receipt of said analysis fees, the state treasurer shall issue certificates of compliance with this act.

SEC. 4. No person shall sell, offer, or expose for sale in this state any pulverized leather, raw, steamed, roasted, or in any form as a fertilizer or manure without an explicit printed certificate of the fact to be conspicuously affixed to every package of such fertilizer or manure, and to accompany or go with every parcel or lot of the same.

SEC. 5. Any person selling, offering, or exposing for sale any commercial fertilizer without the statement as required by the first section of this act, or with a label stating that said fertilizer contains a larger percentage of any one or more of the constituents mentioned in said section than is contained therein, or respecting the sale of which all the provisions of the foregoing section have not been fully complied with, shall pay a fine of fifty dollars for the first offence, and one hundred dollars for each subsequent offence.

SEC. 6. This act shall not affect parties manufacturing, importing, or purchasing fertilizers for their own use, and not to sell in this state.

SEC. 7. The board of managers of the Rhode Island College of Agriculture and Mechanic Arts shall cause to be collected and analyzed, by or under the direction of the chemist of said college, samples of such fertilizing materials as are subject to the conditions of this chapter which may from time to time be sold, offered, or exposed for sale in this state. Said anaylsis shall include determinations of all ingredients mentioned in section 1 of this chapter, and such other determinations as said board of managers may at any time deem advisable. The board of managers of the college shall cause the results of the analysis of fertilizers collected under this chapter to be published, and issue the results to the farmers of the state as rapidly as the progress of the work will allow, together with the comparative commercial value per ton, and such other additional information as circumstances may advise. Said board of managers shall, if so requested by the state board of agriculture, furnish a copy of the analyses made to said board for publication in its annual report.

SEC. 8. The board of managers of the Rhode Island College of Agriculture and Mechanic Arts is hereby authorized to have collected by the chemist of said college, or by a deputy or deputies of said chemist, a sample not exceeding two pounds in weight, for analysis, from any lot or package of fertilizer, or any material used for manurial purposes, which may be in the possession of any manufacturer, importer, agent, or dealer; but said sample shall be taken in the presence of said party or parties in interest, or their representatives, and taken from a parcel or a number of packages which shall not be less than ten per cent. of the whole lot inspected, and shall be thoroughly mixed, divided into two samples, placed in glass vessels, carefully sealed, and a label placed on each stating the name or brand of the fertilizer or material sampled, the name of the party from whose stock the sample was taken, and the time and place of taking the same, and said label shall be signed by said chemist or his deputy, and by the party or parties in interest, or their representatives present at the taking and sealing of said sample; one of said samples shall be retained by the chemist or deputy, and the other by the party whose stock was sampled. It shall be the duty of the board of managers of the Rhode Island College of Agriculture and Mechanic Arts to prosecute every person violating the provisions of this chapter, and for this purpose said board of managers may employ experts if necessary, and in making complaints for violations thereof shall not be required to enter into any recognizance, nor give surety for the payment of costs; there shall be no prosecution, however, in relation to the quality of the fertilizer or fertilizing materials if the same shall be found substantially equivalent to the guaranteed statement made by the manufacturer, importer, agent, or seller.

SEC. 9. For all the purposes of this act, fertilizers shall be considered as distinct brands when differing either in guaranteed composition, trademark, name, or in any other characteristic method of marking of whatever nature.

SEC. 10. The expenses of collection, analysis, printing, distribution, correspondence, and such other expenses as are incident to, and properly arise from, the execution of the provisions of this chapter, shall be paid from and out of the moneys received by the general treasurer under the provisions of section 3 of this chapter, which said sums of money so received are hereby appropriated for the above-named purpose, and the state auditor is hereby authorized to draw his order upon the general treasurer for the payment of the same upon the presentation of vouchers properly approved by the governor.

SEC. 11. Chapter 469 of the Public Laws, passed at the January session, A. D. 1897, and all acts and parts of acts inconsistent herewith are hereby repealed, and this act shall take effect on and after July 1, 1898.

CHAPTER 758.

AN ACT DEFINING THE LEGAL WEIGHTS OF CERTAIN COMMODITIES IN THE STATE OF RHODE ISLAND.

Passed May 4, 1900.

SECTION 1. The legal weights of certain commodities in the state of Rhode Island shall be as follows:

A bushel of apples shall weigh 48 lbs.
A bushel of apples, dried, shall weigh 25 lbs.
A bushel of apple seed shall weigh 40 lbs.
A bushel of barley shall weigh 48 lbs.
A bushel of beans shall weigh 60 lbs.
A bushel of beans, castor, shall weigh 46 lbs.
A bushel of beets shall weigh 50 lbs.
A bushel of bran shall weigh 20 lbs.
A bushel of buckwheat shall weigh 48 lbs.
A bushel of carrots shall weigh 50 lbs.
A bushel of charcoal shall weigh 20 lbs.
A bushel of clover seed shall weigh 60 lbs.
A bushel of coal shall weigh 80 lbs.
A bushel of coke shall weigh 40 lbs.
A bushel of corn, shelled, shall weigh 56 lbs.
A bushel of corn, in the ear, shall weigh 70 lbs.
A bushel of corn meal shall weigh 50 lbs.
A bushel of cotton seed, upland, shall weigh 30 lbs.
A bushel of cotton seed, Sea Island, shall weigh 44 lbs.

A bushel of flax seed shall weigh 56 lbs.
A bushel of hemp shall weigh 44 lbs.
A bushel of Hungarian seed shall weigh 50 lbs.
A bushel of lime shall weigh 70 lbs.
A bushel of malt shall weigh 38 lbs.
A bushel of millet seed shall weigh 50 lbs.
A bushel of oats shall weigh 32 lbs.
A bushel of onions shall weigh 50 lbs.
A bushel of parsnips shall weigh 50 lbs.
A bushel of peaches shall weigh 48 lbs.
A bushel of peaches, dried, shall weigh 33 lbs.
A bushel of peas shall weigh 60 lbs.
A bushel of peas, split, shall weigh 60 lbs.
A bushel of potatoes shall weigh 60 lbs.
A bushel of potatoes, sweet, shall weigh 54 lbs.
A bushel of rye shall weigh 56 lbs.
A bushel of rye meal shall weigh 50 lbs.
A bushel of salt, fine, shall weigh 50 lbs.
A bushel of salt, coarse, shall weigh 70 lbs.
A bushel of timothy seed shall weigh 45 lbs.
A bushel of shorts shall weigh 20 lbs.
A bushel of tomatoes shall weigh 56 lbs.
A bushel of turnips shall weigh 50 lbs.
A bushel of wheat shall weigh 60 lbs.
A barrel of flour shall weigh 196 lbs.
A ton of coal, net, shall weigh 2,000 lbs.
A ton of coal, gross, shall weigh 2,240 lbs.

SEC. 2. All acts and parts of acts inconsistent herewith are hereby repealed, and this act shall take effect from and after the first day of July, A. D. 1900.

REPORTS OF INSTITUTES

AND

PAPERS ON AGRICULTURAL

AND

KINDRED SUBJECTS.

THE RHODE ISLAND STATE BOARD OF AGRICULTURE.

BY HON. WILLIAM WILLIAMS, BRISTOL, R. I.

Whatever differences of opinion may have been entertained of the various systems of political economy, the American people, with characteristic good sense, have always held fast to the veritable truth that all wealth comes from the land. If imitation is the sincerest flattery, it must be frankly owned that Rhode Island paid a well-deserved compliment to the sister States that had inaugurated the introduction of State Boards of Agriculture; and though the State legislature, in stimulating manufactures and aiding commerce, have not been unmindful of the limited area of the State and the imperative necessity of varied industries, they have always cheerfully responded to the care of the farmer that his interests should not be neglected. And when the taxable resources of the State are taken into consideration, it will not be denied that agricultural interests have received much consideration and been fairly supported.

Although the farmers of Rhode Island can not boast of any such sudden and remarkable prosperity as the wheat and corn growers of the West and the cotton growers of the South, the prices of the commodities sold by the farmers of the State, and the permanent and increasing demand for them, attest that, by comparison with the even phenomenal good fortune of the West and South, the farmers can make no just complaint. Nor have they any reason to be ashamed of the comparative product of certain staple crops, such as corn and potatoes, the average for corn in 1901 for the whole United States being 16¾, and for 1902, 26¾, and 1903, 25½ bushels per acre; while the average for Rhode Island for 1901 was 32 bushels, for 1902, 28½ bushels, and for 1903, 30 bushels. The average product of potatoes for the United States in the year 1901 was 65½ bushels per acre, for 1902, 96 bushels, and for 1903, 84¾ bushels; while the product for Rhode Island was 98 bushels in 1901, 164 in 1902, and 125 in 1903. The authority for this statement is the United States Report of Agriculture. I am not aware that any statistics have been, and it is doubtful if they could be, gathered for egg production; but if it were possible, I hazard but little in saying that Rhode Island would present an enviable record. And in the production of milk, it is doubtful if any State could show a higher record. Specialization of crops is rather an accident than the result of either inductive or deductive reasoning. The soil of a certain section may be well adapted to the production of a particular crop, but the climate may be perverse, or climate or soil may both be favorable, yet the difficulty of obtaining any or suitable labor, or the facilities of rapid and economical transportation, will often prove an effectual barrier to specialization. Rhode Island has none of these disadvantages, or only to a minor extent. Charmingly situated on or near Narragansett bay and its estuaries, it has been pronounced by Humboldt to be "the Eden of America," climate and soil both inviting to the enjoyment of life and the pursuit of healthful occupation. In comparison with other States it presents certain foci of congested population which offer markets for the production of perishable agricultural products, such as eggs, milk, butter, and small fruits, that determine the character of the farm products, of which the supply rarely exceeds the demand.

The Rhode Island State Board of Agriculture, like so many similar organizations, is much indebted to the energy and perseverance of a few men whose own pursuits and business experience suggested to them the need of a State organization that, without incumbrance to the finances of the State, would aid and assist young and enterprising farmers to acquire an intelligent understanding of their trade and keep them abreast of the improvements and machinery by which farming was being elevated from mere drudgery to a higher plane. Although the initial steps for the success of this evolution were accompanied with the discouragement that usually attends the introduction of all novelties and innovations, the sterling character of the men attempting it was a hopeful indication that it would be carried to a successful result. To Obadiah Brown, Arlon Mowry, T. C. Warwdell, Governors Wetmore and Brown, the farmers of the State are indebted for a recognition of their claims to be represented as a State institution. The first Board was organized at the State House June 22, 1885, with Governor G. P. Wetmore as president, and C. W. Smith, the present efficient secretary of the R. I. Horticultural Society, as secretary, and the meeting accepted the invitation of the Society for the Encouragement of Domestic Industry to use the rooms of that society for that time. As indicative of the practical good sense with which the organization was started, it may be said that the by-laws, adopted by the Board, November 4, 1885, are practically the same (with some necessary amplifications) as now govern the State Board. The members of the board visited several large and progressive farms in the State to ascertain what steps it was necessary to take to advance the farmers' interests, and it is worthy of note that at the same November meeting the analysis of commerical fertilizers was strongly recommended, and also the importance of conserving the forests and setting out of trees, for which it was recommended that the General Assembly should appoint an arbor day. The modest beginning of the Board may well be illustrated by a suggested amendment to the act creating the Board—that the sum of one hundred dollars may be used for the purpose of giving lectures on agricultural subjects. Comparisons of conditions and statistical tables, though almost startling at times, do not, however, always give a true and fair representation of a thorough and exhaustive examination of many subjects, and may therefore be looked upon, if not with distrust, with a certain wariness justified by experience. This may be exemplified by the statement, contained in the first issue of the Board's report, that according to the United States census there were only 6,216 farms in the State in 1880, the average size being of 103 acres each. In 1902, according to statement on page 35 of the report of the State Board of Agriculture, there were 6,441 farms, with an average acreage of less than 75 acres each. Taken as an isolated fact, this would seem to mean that a large amount of land had gone out of cultivation, and consequently a smaller number of laborers were employed upon the land. But two important factors must be taken into consideration: One, the unquestionable fact that present-day farming, owing to the superior education of the farmer by means of State Boards of Agriculture and experiment stations, has become more intensive and scientific. And another factor not to be overlooked is the vast improvement in farm machinery, by which power is used as an auxiliary and the human labor correspondingly diminished. To these may also be added that eclecticism, which in the presence of good available land neglects that of an inferior quality, so that the reversion of the poor land to its primary condition assists in the conservation of energy, which is a well-recognized law.

It is interesting to turn to the first annual report of the State Board for 1885, and read over the lectures then delivered by men of recognized abiltiy. The fallowing of land was then an admitted necessity, but the advent of commercial fertilizers changed this system of a remote antiquity, and Professor Goefsmann does not hesitate to express a doubt of its wisdom in face of changed conditions. We now know that it is merely an adaptation of the old mechanical formula, that what is gained in force is lost in time, and he wisely remarks that "the unremunerative character of a long duration of fallow, made itself felt near centers of a denser population where an increase in the price of land called for a change." A lecture by Mr. E. Hersey, a member of the State Board of Massachusetts, on potatoes may be read with instruction to-day, and another by that veteran investigator, Professor Stockbridge (so recently dead), on "Plant Constituents," is a remarkable contribution for its insistence upon a thorough investigation of each phase of plant growth. Another lecture by the veteran J. J. H. Gregory, of Marblehead, on the comparative value of barn yard and commercial fertilizers, is an admirable paper, and although we have travelled far since that time, the main features of the lecture are almost unimpeachable. Of course there was a poultry lecture, and no better authority on the subject than I. K. Felch, of Massachusetts, could be found. It is interesting to learn that at the close of the lecture, Mr. Smith, the secretary of the Board, invited some of the audience to remain for the purpose of forming a State poultry association; so it may be said with truth that the Poultry Association of Rhode Island, that has done so much to bring this branch of farming to its high character to-day, is the legitimate offspring of the State Board of Agriculture. There is a prevalent idea that New England has sustained a serious loss in the profits of farming from so many cattle being raised in the West and brought to the East, to the loss of the Eastern farmers; but that this loss is much exaggerated may be inferred from the eighth lecture of the course, delivered by that well-known cattle authority, Mr. E. F. Bowditch, of Framingham, Mass. In this lecture Mr. Bowditch says: "With us at the East, raising cattle for beef is at a minimum, and few farmers give much thought to breeding for beef." The report for 1885 is also interesting as giving the results of experiments conducted at the State farm by a committee consisting of Obadiah Brown, Benjamin Comstock, and C. W. Smith, and it is remarkable as confirming by experience the theories now generally entertained by experts and professional men at the various experiment stations. If this first issue of the State Board has been dwelt upon at some length, it has been because the issue of the first annual report of a new association is apt to be a little crude and ill-digested, whereas in this instance the compilation is excellent, the lectures of a high grade, and the conclusions generally reached are largely in accordance with the more recent deductions of agricultural knowledge and experience. The annual report for 1886 informs us that there has been but little change in the personnel of the Board, and the work of 1885 was steadily continued. In one respect the report of 1886 is inferior to that of the preceding year, as it has no index; but the lectures of that year are of the same excellent character, and the questions propounded by members of the audience indicate the intelligence of the listeners, and the answers the high grade of the lectures. Experiments at the State farm were still continued by the same committee as the previous year. They were chiefly confined to testing the comparative value of the different commercial fertilizers, which were at that time, in conformity with the then existing law, carried on by the State Board of Agriculture; and although the number of such experiments is certainly bewildering, from some imperfection of organized comparative classification, the results attained attest the high grade of many of the commerical fertilizers, a record which it is gratifying to state has in the majority of instances been well sustained to the present time. That this criticism is neither unfair nor unjust may be inferred from the acknowledgment of the committee in their report that "your committee does not feel that satisfaction as to the results of this year's experiments as in former years, owing to the lateness of the time when the committee was appointed," which exonerates the committee. As some of the lectures of 1885 and 1886 were on sheep raising, the profits arising from it, and its adaptability to Rhode Island farms, it is not pleasant to reflect that this, which might and ought to be one of the leading industries of this State, to which it is peculiarly adapted, is, through the absurd dog law, and even its inefficient enforcement, practically abandoned. The writer has repeatedly called attention to this important matter, but without attaining effective results, owing, as he believes, to some petty political obstacle in a refusal to substitute county in place of local dog officers. A remarkable lecture in this course, by Mr. J. M. Hubbard, of Middletown, Conn., will well repay reading to-day. Without being a political tract, it is an admirable presentation of the duty of the State in its relation to the farmers, and in the information it conveys of the early stages of the Grange. An excellent and thoughtful lecture by Mr. Myrick, of Springfield, the editor of the "New England Homestead," will be profitable reading for such as care to investigate and know something of the subject treated; the lecture has the additional merit of simplicity and compactness.

The report of the State Board for 1887 is a continuation of work on the same lines as the preceding years, with some change in the officers. Governor John W. Davis became president and took a deep interest in agricultural work, manifesting an earnest desire to advance and devote no inconsiderable time to the interests of the farm. In the report of the year 1887 we get the first shadow of a disease somewhat occult at that time, but which, judging from the symptoms as reported, might have been tuberculosis. From information sent to the chief office it was learned that certain cattle at or near Wakefield were "affected with some disease that caused them to lose their appetities, shrink in flesh, and show other symptoms of illness." To ascertain the cause, a committee was appointed consisting of Obadiah Brown and W. W. Bailey, professor of botany at Brown University, this latter gentleman's appointment on the committee being dictated by a prevalent impression that some noxious weed might have been eaten by the affected cattle. The report of the Board in determining the cause of the illness was of a non-committal character, and failed to accomplish any amelioration. The commercial fertilizers were at this time analyzed by Professor Appleton, of Brown University.

The reports for 1888 and 1889, containing the subject of lectures delivered during the years, were only eventful as indicating the continued and encouraging growth of interest manifested in the State, and a willingness on the part of the State government to afford all proper encouragement. Mr. C. W. Smith, who had since the organization of the State Board acted as secretary, now retired, and Mr. David S. Collins was elected to fill the place. It is due to Mr. Smith to say that he had worked diligently for the success of the Board at a merely nominal salary, and to his efforts the prosperity of the enterprise may be in no small degree attributed.

In January, 1890, the first important farmer's institute was held at the new experiment station at Kingston (though four small preliminary institutes had been held before), where some good papers were read, and an appetite created for enlarging the scope of the institutes and offering inducements for a larger attendance. The second institute, held at Manning Hall, Brown University, was a remarkable gathering from the character and standing of the speakers, the meeting being opened by Governor Ladd, prayer offered by a prominent clergyman, and an address of welcome from the mayor. As may be surmised, the papers read were of superior order, those by Professor Atwater and Professor Wheeler being very instructive. A paper on agricultural education by H. H. Goodell is well worth reading, and, in view of the louder demand for nature lessons in the public schools, would form an excellent manual for teachers. From the prominent character of the gentlemen attending, the high quality of the lectures, and the large audience present, the State Board felt great encouragement in continuing the lecture course, which seemed to have attained a popular impetus.

Previous to and about this time there arose between the State Board and the Kingston school two causes of difference that for a time affected the kindly relations and in a measure, perhaps, impaired the efficiency of each. When the Morrill act was passed, the annual appropriation it carried was given to Brown University, there being at that time no other available claimant. The university possessed in the immediate vicinity of Providence a tract of land that it was thought might be available for establishing a State school and experiment station; but as large bodies move slowly, the university made no effort to carry out the requirements conditional on the receipt of the funds provided, but simply contented itself with taking the money and deferring further consideration. With the establishment of the State school it became necessary to take some action, and the faculty of the university awoke to the conviction that something must be done. But the committee authorized by the State to acquire land and erect suitable buildings were already in treaty with parties in Kingston to buy land there, and this, with the almost unpardonable inertia of the university, the demand from the South

County farmers that it should be placed there, with the semi-political factor that a new body of professors and officers were to be appointed, conduced to the rejection of the claims of Brown University and the selection of the South County as the site. Some of the members of the State Board were disposed to prefer the selection of Brown University without excess of zeal, but with a conviction that so large and imposing a faculty, with the available central situation, from which all parts of the State could be easily and economically reached, presented to the minds of the dissidents a cogent and irrefutable argument. Without prejudice it may be said that many friends of the present location, in view of its difficulty of access, express doubts of the wisdom of the accomplished action.

The second and more irritating difference arose when the Kingston Station, with the aid of the Grange, began an agitation for the transference of the analysis of the commercial fertilizers sold in the State from the State Board of Agriculture, which had hitherto undertaken it, to the station at Kingston. A change necessitates a reason, and those assigned were a few trivial mistakes either in printing or analysis, and the fact that the report of the chemist was not issued to the framers before the beginning of the season's farm operations. Had it been possible to provide a remedy for the latter complaint by the substitution of the Station for the chemist of the State Board, it would have been a valid reason, but, as a matter of fact, this difficulty seems impossible to obviate. The manufacturers of commercial fertilizers take orders from their agents and customers early in the spring, and then supply their wants, after which samples of such fertilizers are either taken by or sent to the Station at Kingston. The analyses must then be made, the results printed and sent out to the farmers of the State, the latter having by that time already planted the bulk of their crops. After a hearing by a senate committee, the analyzing of fertilizers was handed over to the Station at Kingston, where it will, and probably ought to, remain. A wise forbearance would probably have healed this not very deep wound within a short period of time, but official imprudence deferred the healing process and delayed the establishment of those cordial relations which now fortunately exist.

In 1890 the office of the Board was said to be at the old State House; but as the accommodations were too limited there for a separate office, the business was actually transacted on North Main street in the office of the Narragansett Trotting Park Association, of which David S. Collins (who was the secretary) was also secretary. The same year there was a slight change in the membership of the Board, the Hon. W. T. C. Wardwell, who had represented Bristol county, being succeeded by the writer, and John G. Clarke succeeding Rowland Hazard of Kingston.

From time to time the Board had received letters of complaint from farmers, in different parts of the State, that cattle seemed to be affected with a languishing disease, accompanied by certain specified symptoms, such as cough, emaciation, etc., from which they never recovered. The current agricultural literature of the time occasionally treated of the alarming prevalence of an apparently occult disease among cattle (cows more particular), with symptoms of an identical or similar character. The State Board was not indifferent to these complaints and inquiries, but was always confronted with the fact that the very limited amount of money at its disposal would not admit of any effective measures for the eradication of the evil. As more light was thrown upon the subject by the investigations of specialists and the Boards of Agriculture of other States, it was decided to appoint a committee of three to frame some law through which the Board could aid in the suppression or reduction of the evil. It became clear that the public was becoming alarmed at the frequent newspaper statements as to the danger, especially to children, of consuming milk from diseased cows, and the State Board of Agriculture appeared to offer the most available machinery for a remedy. The members of the committee consisted of Obadiah Brown, Arlon Mowry, and the writer. As the subject was apparently new, the means at our disposal very limited, and the extermination of this disease demanded repressive legislation and immediate action, the problem was difficult to solve; but after collecting much evidence, composing acts one day and cancelling them the next, the act now known as the act for the suppression of tuberculosis was passed, and in May, 1892, the sum of $15,000 was appropriated by the legislature for that purpose. In justice to the members of the committee forming the act, it should be said that they did not receive or ask for compensation for their services.

The first veterinary surgeon to be employed was Dr. Burt, who had made a special study of the disease and was familiar with its symptoms; but the high price required for his services and the limited appropriations of the Board required rigorous economy if the farmers were to be compensated for animals destroyed, and Dr. Parker, a rising young veterinarian, was engaged to succeed him. After remaining with the Board in that capacity for some years, and giving entire satisfaction, his health became impaired and he resigned. To him succeeded Dr. Pollard, a young man deeply interested in his profession, and with an earnest desire to discharge his duty and act courteously and considerately to the farmers, no mean requirement in an office entrusted with power to affect the welfare of those whose property he may be called upon to destroy. His diligence in the suppression of glanders by the destruction of affected animals has been often and justly commended by the Board, by which his services are highly appreciated.

In 1902 the foot and mouth disease was discovered in the town of Cumberland by Mr. Turner, the cattle commissioner for Providence county, and a special meeting of the Board was held on November 20th, when a committee of five was appointed to investigate the disease and report at the next meeting, which was held on the 29th of November, when a full statement of the conditions existing and the number of cattle affected was given to the meeting. Resolutions were immediately passed to establish a quarantine of animals affected, to prevent the immigration of animals into the State from Massachusetts and Connecticut, and also to make immediate application to the legislature for an appropriation of $5,000 to deal promptly and vigorously with the disease. A special committee appointed assistant commissioners to guard the highways and prevent the entry into the State of Rhode Island of any cattle, sheep, or swine from Massachusetts, and also prevent the sale of products from affected animals. These measures, with the exercise of great diligence on the part of the cattle commissioners and officers of the general government, which was now thoroughly alarmed at the number of cattle affected and the rapidly contagious character of the disease, were effective. The general government, fearing the effects upon the foreign cattle trade, destroyed cattle, fumigated buildings, and took the most drastic measures for extermination. Everything that experience suggested and medical skill could devise, was done so that the disease was but short-lived; and on the 2nd of December the executive committee authorized the raising of the quarantine, the dismissal of special agents, and the resumption of normal conditions.

From time to time changes were made in the personal representatives of the Board, as the Governor and Lieutenant-governor for the time being, and some of the appointees of the agricultural societies. The retirement of Mr. Arlon Mowry was deemed regrettable, as his familiarity with the requirements of law, knowledge of farming, and high standing in the community were pledges of his devotion to agriculture and ability to foster and improve its methods. On the retirement of Mr. Collins, as secretary of the Board, in 1892, Mr. George A. Stockwell, of Providence, was elected to succeed him, and proved himself a competent officer in that capacity. His incumbency lasted till 1902, and probably would have lasted longer but for an unfortunate coolness between himself and the schools and Experiment Station authorities at Kingston, which it was felt by many members of the Board impaired its efficiency and imperilled that co-operation essential to progress. The present efficient secretary, Mr. John G. Clarke, of Kingston, was formerly a member of the State Board, and is a prominent member of the State Grange. His selection has done much to re-establish hearty working relations with the Kingston Station, which will be of incalculable value to the farmers of the State.

The birth and growth of individuals, communities, and nations are the most interesting parts of their career, as illustrating the vicissitudes through which each must pass to a sturdy maturity. Interest in this adolescence is somewhat abated from a knowledge that it will follow certain laws and procedures with which we are too well acquainted to evoke more than passing comment. The recapitulation of the lectures, the number of institutes held, would make this account of the growth of the State Board too long to be acceptable to the average farmer. Suffice to say that many of the lectures and discussions published in the annual reports make an interesting and instructive course of reading and study not only for the experienced, but for the young farmer.

As new questions have arisen, the Board has not failed to respond to the new requirements. Nursery stock is now inspected, and trees found to be infested with dangerous insects are destroyed. A hearing at the rooms of the Board was given to farmers and nurserymen last year to learn what action could be taken to prevent the ravages of the San Jose scale and the gypsy moth, and after due consideration an appeal was made to a committee of the Rhode Island senate to recommend a small appropriation for the purpose, which unfortunately failed of success. The Board, however, is deeply impressed with its importance, and will take every opportunity of pushing the propaganda of extermination, well knowing that the very existence of trees in the neighborhood of Boston and other places is threatened, many trees in villages and towns having been completely destroyed.

In conclusion it may be said that the members of the State Board have not forgotten that they are the servants of the farmers, and only await suggestions and representations from them to make any change for improvement.

THE ECONOMICS OF GOOD ROADS.

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The march of civilization has ever been marked by conflicts between man and man, and between man and nature. Each onward step has been made by the keen of mind and strong of limb, and a study of the past gives ample proof that with man and nations it has been a survival of the fittest from the earliest recorded historical event to the present time. Few and easily supplied were the wants of primitive man. Contentment came from a sufficiency for the time being, with no thought for the future. Progress begins with storing the surplus of one time and place for use at other times and places.

It is the moving of this stored surplus from one place to another that we are to discuss. Its discussion involves a study of the transportation problem, beginning with the pack on the back of man or animal, and ending with those leviathans that connect continents, those ways of steel that connect oceans; the two jointly annihilating time and space, binding the different countries together and ameliorating the sad conditions resulting from dread famine, so common in the earlier history of the world.

Rome, the imperial republic, in the early days of its policy of expansion, four hundred and twelve years before the dawn of christianity, realized the importance of easy means of communication, and inaugurated a system of roads which grew with the empire and connected the remotest provinces with the imperial city. Over these roads passed the official couriers, the armed legions, and commercial traffic. They materially assisted in establishing that prestige which made Rome mistress of the world. With the downfall of Rome, her wonderful road system fell into disuse. In many cases the roads were overgrown by trees and lost to view. If we can believe the writers of the early nineteenth century, even the main ways in the vicinity of great cities were practically impassable.

The Princess de Lamballe graphically describes the condition of the main roads connecting Germany and France; so bad were they that fatal accidents were a common occurrence. Lamartine tells of a journey of his family, in 1790, from Paris to Milly, a distance of twelve miles, which required an entire day in which to make it. Arthur Young, writing of England in 1817, says: "The roads are so very bad that, whichever one takes, he wishes before reaching his journey's end that he had taken the other." Macaulay says: "The crops rotted on the ground in some parts of England, while the people of other parts were starving . . . the bad condition of the roads rendering a distribution of the surplus impossible."

Such were the general conditions in Europe when Napoleon, in 1804, undertook the building of the first modern road of any importance, the road across the Alps, at the Simplon Pass. The hardships of Napoleon's army, in its first passage of the Alps, are well known historical facts; they were of the same nature as those which nearly annihilated Hannibal's army twenty centuries before.

As a military necessity the Simplon Pass road was built, and its building was the inauguration of a road system in France which is surpassed by no other country. Over these hard, smooth roads passes the traffic of the country. The farmer is, in a measure, independent of the railroad, and sixty miles is not an uncommon distance for his carting, while the loads are large and the time on the road short. In Belgium good-sized loads of market stuffs are hauled many miles by dogs. In fact, the good roads movement was carried on so persistently in the different countries of Europe during the nineteenth century that to-day a bad road is the exception rather than the rule. To build these modern roads, the nations of Europe have expended hundreds of millions of dollars. The work was begun after much discussion, and with full knowledge of its probable cost. There can be no question but what the results prove the wisdom of the expenditure.

The ancient Roman and modern European roads were built by men especially trained in the art of road-building. In some of the European countries schools are now and for many years have been maintained for instruction in this art, and men make it a life study and business. Poor roads are a tax upon the time and upon the moral, educational, and social life of a community. With most men, time is their only available asset. If it be well invested, the result is a comfortable home, pleasant surroundings, and luxuries in a greater or less degree. The loss of time, due to traveling over poor roads, is a variable quantity, varying with the road, its use, and the season. Whether it be great or small, it is a positive and preventable loss. The time thus lost, in very many cases, means a direct money loss, as it could have been used profitably in some other direction or to accomplish more in the same direction. In these days of close competition, one must exercise the greatest care to make every handling of goods with as little expenditure of time as is possible.

It seems almost an insult, to the intelligence of a New England audience, to argue on the saving due to enlarged loads and shortened time made possible with good roads. Many have attempted to place a money value on this saving, but the figures are so large that few will believe them. Reduced grades and improved surface must of necessity mean a saving of time and effort, and reduce the cost of transporting goods. Competition is so close that the farmer, the manufacturer, and the merchant can only expect to succeed by paying the strictest attention to economy and by using the best and most modern methods and machinery. Improvements in boilers and engines have so reduced the cost of steam power that a manufacturing plant run by water power, located three or four miles from its railroad station, with bad roads intervening, can not compete with steam power placed near the railroad. The tax on transporting the crude materials and manufactured goods over the bad roads more than eats up the saving in cost between water and steam power. Scores of cases could be cited where, over the improved road, double the load can be hauled in from one-third to one-half the time, even in good weather, with a still greater difference at certain seasons of the year.

The price of every load of milk, of hay, of farm products, every load of coal or of lumber, is affected by bad roads, and either the producer loses or the consumer pays more on their account. This question can not be dodged; as the man who does not own a horse and use the roads is as much a loser as he who does, and both alike can afford to share the cost of making and maintaining good roads.

If one should stop for a moment to consider the immense quantity of all kinds of surplus products transported over the highways, he would forgive the enthusiast if he does set his figures high. It is within the bounds of reason to say that each and every one of the forty million tons of freight hauled by the railroads of Massachusetts last year was hauled over the highway once, if not more, somewhere. It is also safe to assert that an average of twenty-five cents a ton would be an absurdly small figure to set as the saving in the cost of transporting these goods over good roads. A saving of but twenty-five cents on each ton would mean a saving of ten million dollars in one year. I do not give these figures as exact figures, but simply to show the possibilities that exist. Of the farm products of Massachusetts, I think I am safe in saying that fully one million tons a year would be affected by the highway haul, and affected to the extent of fully twenty-five cents a ton. The value of the annual manufactured goods of Massachusetts is twenty times that of the products of the farm. Much of this is loaded directly onto the cars and ships, but enough of it is hauled over the highways to make quite a goodly item. If one considers these things he can not fail to see that proper attention has not been given to economizing along these lines; that, with all our boasted advance in means of transportation by steam power, but little or no advance has been made in highway transporation.

SCHOOLS AND EDUCATION.

For a moment let us consider the relation between roads and schools in the country towns. It has been the policy of Massachusetts for many years to consolidate the schools, and the different municipalities are authorized to transport children between homes and schools. The State Board of Education in its last year's report, says: "The process of consolidating small and expensive schools is still going on. The total expenditure for conveyance, $165,596.00, exceeds that of a decade ago by $115,006.00. The policy of uniting small schools in larger central ones and conveying the children thereto has made great strides during the decade. The movement is a wholly voluntary one, the law authorizing but not requiring it. It means, on the whole, better buildings, better appointments, better grading, better teaching, better results."

Granting the truth of this statement, what must be the punishment of the children and the waste of time, particularly in the spring months, due to being dragged through some of our New England roads? This discomfort and waste of time are entirely distinct from the cost, which should surely be materially lessened if the service were over well-built roads.

While discussing this problem, let us not forget the relation between roads and social life. Much stress is placed, by writers on political economy, on the present tendency to aggregation of population in the cities. The bright young man and woman too often leave the farm at the earliest opportunity. Doubtless the city is thus benefited, but is it not a distinct loss to the country? Is it not possible, in a measure, to remedy this by making country life more attractive, by making social interchanges possible and pleasant, not only for parts of but during the entire year?

We should not have to go far to find instances where roads are so bad in the spring-time as to act as a complete bar to social calls. Neither should we have long to hunt for sandy roads that are such a tax upon time and patience that they are used only in cases of necessity either in spring or summer or at any other time.

STEAM AND ELECTRIC RAILROADS.

Let us now look at the transportation problem as it has been worked out by the steam and electric railroads. For my own convenience, I shall use the figures given by the railroad commissioners of Massachusetts, and without doubt they would hold good throughout the United States.

At the close of 1903 there were 2,106 miles of steam railroads in Massachusetts, costing, to build, four hundred eighteen million, three hundred thousand dollars. Last year these railroads transported nearly one hundred sixteen million passengers and forty-one and a half million tons of freight. Each passenger was hauled an average of 17.14 miles; each ton of freight, 86.7 miles. The average cost per mile to each passenger was 1.73 cents; to each shipper of freight, 1.24 cents per ton. At these low rates there was distributed in the shape of dividends about thirteen and a quarter million of dollars.

Since 1873 the charges have been reduced from 2.32 cents a mile for passengers, and 2.75 cents per ton per mile for freight, the reduction being about twenty-five per cent. on passenger service and fifty-five per cent. on freight. It must be borne in mind that probably none of the rails, ties, bridges, or rolling stock that were used then are in use to-day. They have all, or practically all, been replaced by new, and this replacement has been paid for out of the earnings. Notwithstanding these large outlays of money, the charges have been reduced, and liberal dividends are paid, as already noted.

A reduction in the charges, per mile, of three-tenths of a cent for each passenger and two-tenths of a cent for each ton of freight, would eliminate the thirteen millions of dollars of dividends; or a return to the charges of thirty years ago, with the present facilities, would add to the dividends about sixty-six millions of dollars.

It is evident that, by the expenditure of many millions of dollars for heavier rails, better ballasted roadbeds, and more economically operated locomotives, there is a saving to the patrons of the steam railroads of Massachusetts of sixty-six millions of dollars a year. It must be borne in mind that, with all the large outlay for changes in alignment and grade, for locomotives and cars, safety and economy can not be had without constant watchfulness and care of every foot of roadbed and every part of the rolling stock by men with mechanical skill, good eyes, and strong arms.

At the end of 1903 there were 2,466 miles of electric street railways in Massachusetts, costing, to build, about ninety-eight millions of dollars. Last year these railways transported 465,474,382 passengers, and paid dividends amounting to $3,138,711.00. It is interesting to note that the dividends are equivalent to sixty-seven hundredths of a cent for each passenger.

Another interesting feature of the street railway problem is that the dividends constitute but thirteen and four-tenths per cent. of the gross earnings, while sixteen and seven-tenths per cent. of the gross earnings of the steam railroads are thus paid out. When the street railway companies shall devote the same care to building and grading as has been done by the steam railroads, their dividends will constitute a larger part of the gross earnings.

There can be no doubt about the benefits of good roads. Neither can there be any doubt that both producer and consumer are benefited thereby. Granting the truth of this statement, the next question is how to obtain them. The ancient roads of Rome were built by the nation as a military necessity. The French system was begun and continued for many years, for the same reason. In fact, practically the entire road systems of modern Europe have in a large measure been built by the general or State governments and paid for out of common funds.

In the United States, excepting the seven or eight millions of dollars paid for building the Cumberland road, the general government has done nothing in this direction. Several of the States, however, have taken up the work, and are making good progress.

A study of statistics shows that fully one-third of the towns, even in the older and more densely populated States, are financially unable to build first class roads. If the cost of this class of public improvement be distributed over the entire State, it ceases to be a burden and becomes a reasonable proposition.

Producer and consumer, user and non-user, being alike interested, from a financial standpoint, there is no good reason why they should not both be taxed, regardless of the fact of their living in the country or in the city.

I shall now endeavor to prove that road building by the State is productive of much good and that the burden on the taxpayer is almost inappreciable. Being more familiar with the work of Massachusetts, I will use it to illustrate what I have to say as to cost.

The old Bay State started to build good roads ten years ago. She has already built about five hundred and fifty miles, and expended about $5,390,000 for building and repairs. These roads are built and repaired by the State. The money is obtained by issuing bonds, running thirty years. The bonds are cared for by a sinking fund, and there has been paid out on account of these bonds an average of thirty-seven thousand dollars a year. The counties pay back to the State one-quarter of all amounts expended by the State, both for construction and repairs. It will thus be seen that each taxpayer in the State pays first on account of the State and second on account of the county.

The average cost on account of the apparently large outlay by the State, has been one and seventeen one hundredths-cents annually on each thousand dollars of valuation. This covers both construction and repairs. The amount paid on account of the counties varies with the expenditure in and the valuation of the county; for example, Middlesex, one of the large and rich counties, paid in 1903 $15,381.00 for construction and $3,152.00 for repairs. This amounts to a tax on each thousand dollars of two and nine-tenths cents for construction and fifty-seven hundredths of a cent for repairs.

To pay all the charges on account of State roads, in 1903, the taxpayer of Middlesex county paid on each one thousand dollars of valuation one and seventeen-hundredths cents on account of the State's expenditure, two and nine-tenths on account of the county's expenditure for construction, and fifty-seven hundredths of a cent for repairs. This makes a total payment by the taxpayer of four and sixty-four hundredths cents on each thousand dollars.

Is there a farmer, or manufacturer, or merchant, or householder who would begrudge the payment of fifty cents a year on his property, valued at ten thousand dollars or more, if by the payment of that small sum for a few years he would be assured of good, smooth, hard roads throughout the year? Throw aside the possible saving in cost of transporting goods, is not the payment of this small amount warranted on account of the pleasure it will give, and on account of the impetus given to the social, educational, and religious life of the community?

As proof that the State road tax is not considered a burden, it can be stated that the towns of Massachusetts have, during the past ten years, appropriated from their own funds a sufficient sum to build between six and seven hundred miles of broken stone roads. This has been done with the firm belief that it is a good investment and will return a large dividend to the taxpayer.

In conclusion, let me say that road building is an art, and can only be carried on properly by well-trained men. This has been proven in European countries, and is beginning to be believed in our own country. The higher schools of education have for many years been turning out men well equipped in almost all branches of engineering. Some of these schools are introducing highway engineering as a regular course. The effect of this educational influence is sure to be felt in the near future, and the time is not far distant when we will not need to cross the ocean to find good road builders or perfect systems of roads.

IS FARMING PROSPEROUS IN RHODE ISLAND?

JOHN G. CLARKE,

Secretary R. I. Board of Agriculture.

In looking over the State, one will find large areas which have the appearance of being once fertile farm lands, but now are desolate and deserted; meadows and pastures growing up to brush, houses and buildings tumbling down, all of which goes to present a very forlorn picture.

In other sections will be found thrifty looking farms with good homes and with buildings neatly painted. Some of these are dairy farms, some poultry, others market gardens, nearly every branch of agriculture being represented; the whole of which presents a most beautiful and interesting picture of industry and success.

Which of these two pictures represents the agriculture of this State to-day?

Is farming prosperous or not?

Rhode Island is a manufacturing State, ranking among the first in the country in her manufacturing interests; for this reason her agriculture has been lost sight of by the world, who has heard of nothing but her manufacturing. It does not follow, however, that our farming interests are unimportant, because not known to any extent outside our own borders; for the facts are that our agriculture plays a very important part in the welfare and prosperity of the State.

Thirty years ago, scattered all over this State were little villages, each of which had its own cotton or woolen mill. In 1870 the town of Exeter had seven of these establishments, while to-day she has none. Exeter is not alone. All of our country towns, especially those off of railroads, have witnessed the passing away of their manufacturing industries.

When all these little mills were running, the farmers in their immediate vicinity had a ready market for their milk, butter, eggs, and vegetables, without having to ship them away to distant cities; for what the village people could not use was taken to the mill store, and sold or traded for goods from the store which the farmer did not raise but had to have. Thus the village store became a sort of commission house, buying and selling farm produce, and shipping it to the city markets, taking all of that responsibility and experience from the farmers, who in the end were to be the losers by not knowing how to handle their goods.

As competition forced these little establishments out of business, the people drifted, as did the business, to the cities and large towns. With them went not only the retail markets of the farmer, but the wholesale market as well; for the country store could not live on the profits gained from handling farm produce, and were obliged to close. Thus the farmer's market was gone, and he must look elsewhere for a place to sell his produce.

Not only had the farmers lost their original market, but the railroads were opening up the great West, which began to ship its produce to our markets. All are familiar with the results which followed: Our farmers could not compete with their Western brothers who had only to plant the seed in the fertile soil and harvest the crop. Our soil had been robbed and it was necessary to supply fertility in order to grow crops, which greatly increased the cost of production. Other changes occurred.

Fifty years ago, or even thirty years ago, on nearly every farm would be seen a flock of sheep grazing over the pastures, and the farmers realized a good profit from them. My father used to say that he had kept sheep when the fleece would pay the keep of the sheep and the lambs were clear profit. Here again came Western competition,

Farm House and Buildings of Geo. L. Barber, Exeter, R. I.

and our sheep industry has gone, perhaps due not entirely to Western competition, but largely so. In 1850 there were in this State 44,296 sheep; in 1870, 23,938; while in 1900 there were only 6,629; a decrease of 85 per cent. since 1850. There has been a great decrease in certain other farm lines; none quite equal the sheep, but swine follow closely. Statistics, however, are not all on one side.

The last United States census shows that since 1850 our farm wealth has increased $7,888,549, and that the value of our annual product has increased very rapidly during the last few years. Many of the farms that were deserted are again being improved; farms that were a few years ago regarded as totally useless are being successfully utilized for poultry farms. There is always a good demand for poultry and eggs, and the price of the home product is always in advance of that from the West. In the town of Little Compton we find a grand illustration of what can be and is being done in the poultry business. There are still many farms which can be utilized along this line to the great advantage of the State and the farmers. The production of eggs alone increased 59.2 per cent. between 1890 and 1900. This is an industry which does not demand as quick transportation as some others, and is therefore adapted to those farms that are a long distance from railroads.

The dairy industry has greatly increased during the last few years, and our farmers are producing many hundred cans of milk that are being shipped to the cities to supply our city friends with milk and cream.

Other farmers are turning their attention to raising hay for market. There is probably no more paying crop to-day than hay, and no better hay market in the world than Providence.

Near the cities and large villages, market gardens are very profitable. In 1900 there were 4,873 acres of vegetables reported. This does not include potatoes and onions, which alone were valued at nearly a million dollars. A large percentage of the former were raised on the Island of Rhode Island. This branch of our agriculture ranks second in the value of the product (hay and forage ranking first).

Fruit growing is attracting the attention of many of our farmers, and should prove a very profitable business. The consumption of fruit has increased faster than any other article of food, and will continue to increase. Good fruit put upon the market in an attractive way always brings good prices.

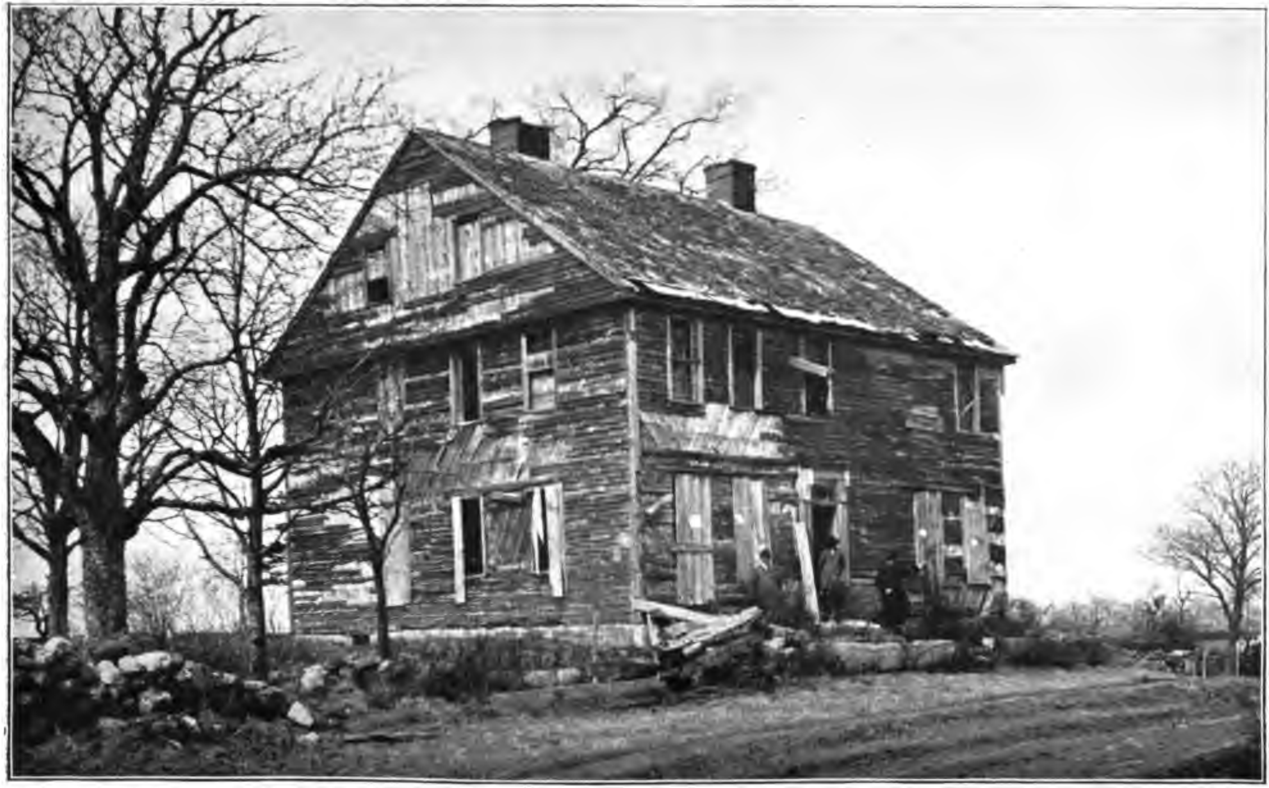
The greatest advancement along agricultural lines is farming under glass, which includes the growing of both flowers and vegetables. In the census of 1900 there were reported 1,397,100 square feet under glass in this State.

If the passing away of these little mills from all over the State, together with Western competition, caused many farms to be abandoned, and some branches of agriculture to diminish, what has caused others to build up and increase?

This is the most thickly settled State in the Union—425 people to the square mile—and Providence is the richest city, per capita, in America. Thus we have the very best markets for our produce. These markets have largely been supplied from the West. Our own farmers, who had always depended upon the markets of the little villages, not being awake to the possibility of the larger and better market which existed right at their very doors.

As the great West grows in city population and manufacturing interests—and it is growing rapidly—they will consume more and more of their own produce and slowly withdraw from competition along various lines. All will admit that the West will always be a competitor in our markets, but they have for years been growing crop after crop from the soil without restoring much of the plant food removed, until now they are finding it necessary to use fertilizers, thus increasing the cost of production and reducing their profits; this will tend to cause the Western farmers to stop competing in our markets, in the more perishable products, and leave them clear for the home growers.

Not only has our large city population to be fed, but our summer resort people as well; and here we have one of our very best markets, for our summer visitors are willing to pay a good price for a good



An Abandoned Farm House.

article, and our farmers must cater to this trade, supply them with water at twenty cents per quart in the form of strawberries and raspberries and other fruits, and furnish them first class vegetables put up in an attractive way.

Again, many of the farms that were once a long distance from market are being brought closer by the electric cars that are now running to all points of the State and offering quick and cheap transportation. Many country districts have been awakened again to life by the introduction of trolley lines.

Our towns and State are recognizing more and more the value of better roads. Many of our towns have taken rapid strides along this line, and now the State has taken the matter in hand and is establishing a State road system which promises to be of great value to our farming as well as to all other interests. This brief review shows clearly that, in spite of many drawbacks, agriculture has advanced slowly but surely; that while many have failed, a larger number have succeeded; and taken as a whole, farming in Rhode Island is a success; but there is still another side to the case which should be taken into consideration in order to fully measure the success of the farmers.

Under the changed conditions, newer and better methods had to be adopted; our farmers were brought in closer contact with the rest of the world, and with each other; farmers' organizations were formed which brought them together for the discussion of questions of mutual interest. And right here the Grange came to fill the long felt want, and it stands next to the church and school only, for the advancement and betterment of all mankind.

Better schools were demanded, for the farmers required a better education. Our National Government recognized this fact, and laws were passed providing for the establishment of agricultural schools in every State in the Union. A few years later, by act of Congress, the standards of these schools were raised and they were allowed to confer degrees, this making them colleges. The history of these institutions is too well known to require a long review of their work, suffice it to say that they are doing everything in their power to accomplish the results for which they were created, and their influence is being felt by all the civilized world. Not only did Congress establish schools and colleges for the study of agriculture, but experiment stations as well. These have been of unmeasurable value to the farmers, and the results already obtained from the work of our own State experiment station will fully compensate for the money already expended, and money to be expended for years to come, even though the future work they should accomplish were useless; but we have reason to believe that the work they will do in the future will far exceed in value that done in the past.

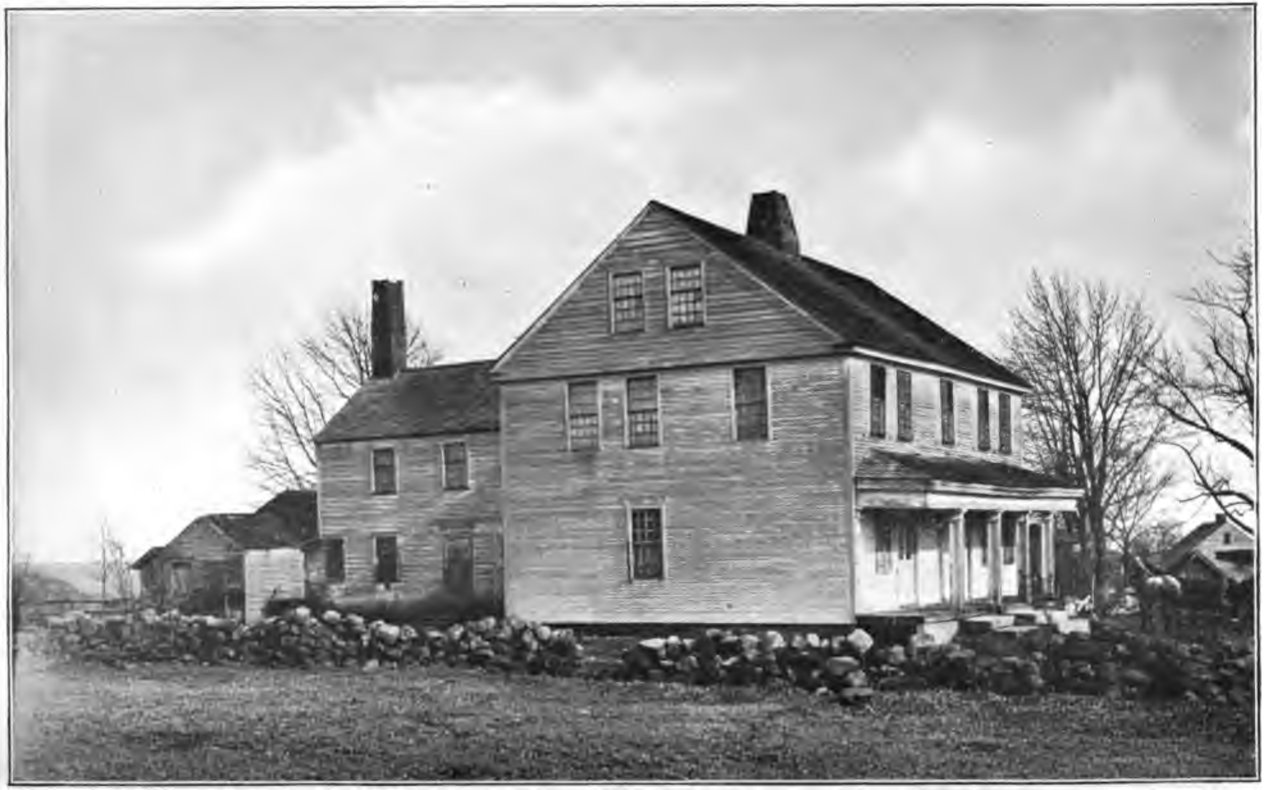
Rhode Island is to be congratulated for having the best laid out experiment plots in the United States or in the world.

Thus the whole rural community was brought up to a higher standard of life and civilization. No longer is the farmer a farmer because he does not know enough to be anything else, but a farmer because he knows enough not to be anything else. No longer is the life of the farmer looked upon as one to be despised, but as one to be desired.

This is an age of artistic agriculture. Years ago our farmers had only to raise a crop and take it to market; appearance made but little difference to its selling value: Fruit was fruit, and vegetables were vegetables; any kind of a package would do as long as it would hold its contents. To-day, an article pleasing to the eye as well as the taste is demanded, and neither can be lacking. Thus a farmer to succeed must first grow produce of the best quality, then put it upon the market in neat packages, properly graded. The best in both quality and appearance is demanded.

Aside from any financial consideration, this educational and social advancement which has been brought about justifies all the temporary depression agriculture has suffered, for under old methods these changes would never have taken place.

The question, "Is Farming prosperous in Rhode Island," will depend somewhat upon what our ideas of prosperity are.



An Abandoned Farm House.

Stone Piles in a Meadow.

To be successful as success was measured a century ago is not sufficient.

With a new era come new standards of measurements.

Even to gain financial independence is not enough.

Through organization, the farmer comes to feel himself a part of society, with a work to do, and a place to fill. As he learns to do that work better and fill his place in society to a nobler purpose, will his success be more complete. Then will he take his place as an equal among men of other professions, and, seeing what the farmer is doing for himself, his neighborhood, and mankind, no one will ask "Is farming prosperous?"

THE SAN JOSE SCALE AND GYPSY MOTH.

BY EDWARD H. ARMSTRONG, PROVIDENCE, R. I.

The State of Rhode Island has been infested in the last few years by a number of injurious insects, some of which are multiplying to an alarming extent. That these insects can be successfully combated is shown by the experience with the elm leaf beetle (*Galerucella luteola*), which for a number of years previous to 1901 was creating such havoc with the elm trees of Rhode Island; but since the trees have been cared for the beetle has greatly decreased, and another two years will see its practical extermination.

The insect which we have reason to dread the most is the gypsy moth (*Porthetria dispar*), which, from its wide range of food plants, as it eats almost everything green, its immunity from parasites and disease, is constantly on the increase. Other insects which we have to contend with are San Jose scale (*Aspidiotus perniciosus*), which confines its attention mostly to fruit trees, the elm leaf beetle (*Galerucella luteola*), maple pseudoccucus (*Pseudoccocus aceris*), willow weevil (*Cryptoshynchus lapathi*), and the leaf stem hickory gall (*Phylloxera caryœ caulis*). all of which are recent additions to our fauna, will continue to be injurious to the plants to which they show a partiality, as their names suggest, but are more apt to be local, and therefore more easily handled.

Most of our trouble with insects is with that class which have been introduced from foreign countries where they were more or less injurious, being held in check by the native parasites and diseases which to our regret were not introduced with them. With this class of insects, we must find artificial means to take the place of the natural ones, which kept them down or only allowed them to increase periodically.

There has recently been appointed by the State Board of Agriculture a nursery inspector whose duty it is to prevent more of these pests from coming into the State, and to prevent the distribution of those already here from stocks in infested nurseries. This will, no doubt, help to a great extent to keep the trees and orchards of the State in good condition.

The gypsy moth, which interests us most at present, was introduced in Massachusetts by a French naturalist, Mr. Trouvelot, in 1868 or 1869, while experimenting with silk worms. A number of eggs or larvæ were blown or escaped from a window of his residence, and has since cost the State of Massachusetts $2,000,000, and as much more in damage has been done to forest, orchard, and shade trees of that State.

No attempt was made for twenty years to destroy this insect, at which time the increase had been something enormous. The following extracts from a Massachusetts report will show what the gypsy moth has been in Massachusetts:

"The number of caterpillars that swarmed over certain sections of the town (Malden) during the latter part of June and most of July, 1889, is almost beyond belief. Prominent citizens have testified that the 'worms' were so numerous that one could slide on the crushed bodies on the sidewalks; and that they crowded each other off the trees and gathered in masses on the ground, fences, and houses, entering windows, destroying flowering plants in the houses and even appearing in the chambers at night. The huge, hairy, full-grown caterpillars were constantly dropping upon people on the sidewalks beneath the trees, while the smaller larvæ, hanging by invisible threads, were swept into the eyes and upon the faces and necks of passers. The myriads that were crushed under foot on the sidewalks of the village gave the streets an unclean and filthy appearance. Ladies passing along certain streets could hardly avoid having their clothing soiled and were obliged to shake the caterpillars from their skirts.

"Clothes hanging upon the line were stained by the larvæ which dropped or blew upon them from trees or buildings. In the warm, still, summer nights a sickening odor arose from the masses of caterpillars and pupæ in the woods and orchards, and a constant shower of excrement fell from the trees. The presence of this horde of gypsy-moth larvæ had become a serious nuisance, and was fast assuming the aspect of a plague. The condition of affairs at this time is best shown by the following extracts from statements of residents:

" 'The caterpillars used to cover the basement and clapboards of the house as high as the window-sill. They lay in a solid black mass. I would scrape them off into an old dish pan holding about ten quarts. When it was two-thirds full I poured kerosene over the mass of worms and set them on fire. I used to do this a number of times a day. I have used, in burning caterpillars, five gallons of kerosene in three days.

" 'I used to scrape them off the sides of the house and treetrunks with a dust-pan. Many got into the house and we could not open the windows. I found them in the kitchen and in the bedrooms. I used to find them in the beds when I turned down the blankets.

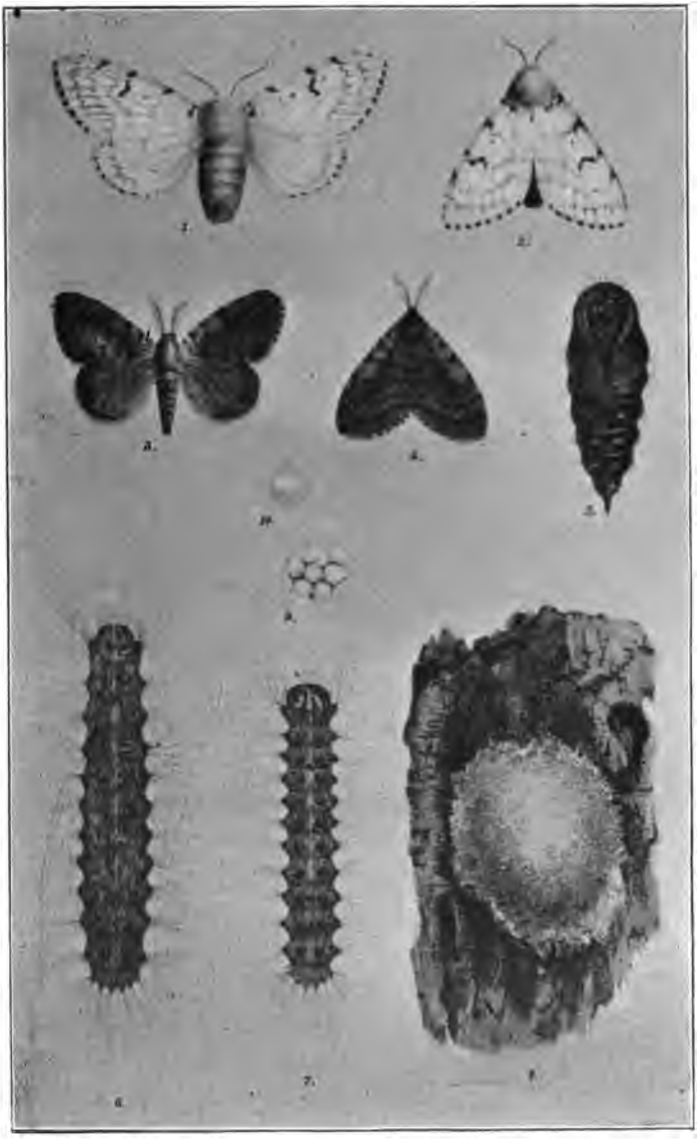
" 'The caterpillars covered one side of my house so thickly that you could have told what kind of paint was on it.

" 'In a neighbor's yard they brushed off one apple tree at one time fourteen quarts of caterpillars.

" 'The bad condition of this section as regards the gypsy-moth plague was detrimental to real estate valuations.

" 'At night in the lindens in front of the house there was a noise like the gentle falling of rain. This was the noise of the caterpillars eating the leaves.

" 'We had both the steps and fence split up and burned so as to deprive the pest of its harboring places. I have frequently gathered half a coal-hod full of caterpillars within a short space of time; in twenty minutes they seemed to be just as thick as ever.



Gypsy Moth.

" 'Our vegetable garden was practically ruined by them, peas, beans, corn, etc., being eaten. The garden of our next-door neighbor suffered a like fate.

" 'For three years previous to 1891 my Baldwin apple tree bore no fruit on account of the ravages of the moth; it was stripped every year.' "

The occurrence of the gypsy moth in Rhode Island was first brought to our notice by Mr. Prescott O. Reynolds, who found the moths and patches of eggs on the trees on Courtland street, July 31, 1901. Specimens from this colony were at once taken to Boston, by Mr. James M. Southwick, to be verified, which was very readily done, as there can be no mistaking the eggs and moths of this species when once known. Mr. J. W. Stockwell, secretary of the State Board of Agriculture of Massachusetts, and Prof. A. H. Kirkland immediately came to this city to investigate the outbreak of the moth. After looking over the ground it was their opinion that the moth had been in Providence two or three years and was to be found over an area of five or ten acres.

With one hundred and twenty-five dollars which Mr. J. M. Southwick was authorized to spend, it being part of an appropriation of the city council, a more thorough investigation was made, which revealed the fact that the moth was spread over a considerably larger area, and colonies were found much worse than the first.

The egg patches which began to show very prominently were treated with a mixture of creosote and coal tar, which completely destroys their vitality. Over 100,000 patches, averaging 500 eggs, were destroyed at this time; but as the appropriation was so small, and completely expended, the work was stopped.

The moth has one brood a season, of 500 eggs, which are covered with yellowish brown hair from the abdomen of the female, each egg being separately imbedded and making a solid felty mass, the adhesiveness of which is not destroyed by chloroform, alcohol, or turpentine. The patches are of a more or less regular shape, depending upon the surface upon which they are deposited, usually being from an inch to an inch and a half in length by an inch in width. Egg patches have been found in Rhode Island which had been frozen in the ice all winter and under water for a month in the spring, and yet hatched at the usual time. It is claimed that 150° F. and 30° below zero is necessary to destroy the eggs.

We found the eggs in all sorts of positions, on trees, fences, doorsteps, tree boxes, sidewalks, underpinnings of houses, and curbstones. At a place off Cranston street we found the hen coops and outbuildings, both inside and out, thoroughly plastered with the egg patches; this place was so bad that we were requested to put a finish on the job by painting the entire building.

In another place we found a bunch of bean poles which were leaning in the form of a tree. The spaces between these poles, which measured about three feet at the bottom and a foot at the top, were completely filled with eggs, pupæ, and larvæ, and female moths. The entire mass, poles and all, was destroyed by the aid of kerosene. An orchard which we inspected had an immense quantity of eggs, both inside and outside the trees. A great many of the trees were hollow and the male moths were flying in and out of the holes, fertilizing the females which had gone into these holes in the caterpillar state, changed to pupæ, emerged as moths and laid eggs, thus passing four stages of their existence out of sight. For every female caterpillar that entered these holes, five hundred came out.

Lone willows, in a number of situations, were completely covered with eggs near the roots. Trees on Harvard avenue were full of egg patches, as many as two hundred patches being found on a single tree. Harrison street and Broadway were also in very bad condition. We found them in a woodyard in South Providence from which wood was constantly sent to all parts of the city, as were also large quantities of drain pipe. The entire place, buildings, cord wood, drain pipe, and wagons were badly covered with eggs and no doubt helped the spread of the moth. All these places, as well as others, were treated by the aid of the first appropriation.

Nothing more was done until the following fall, when the Providence Tree Protective Society entered into a contract to have the eggs treated that fall and winter, with the result that a number of new colonies were found and several millions of eggs destroyed.

The following summer the Providence Tree Protective Society furnished funds for banding trees; over two hundred trees were banded in various parts of the city. Large boxes of caterpillars were collected daily from the bands, and destroyed. As the amount furnished was small, being but fifteen dollars a week for help and all expenses, burlap, twine, car fare, etc., we were obliged to take this method that we might know something definite was being done. The work was continued until the caterpillars were nearly full grown. No attempt has been made since then (1903) to destroy the gypsy moth, and it has since largely increased.

The banding of the trees was begun about the tenth of May, at which time the eggs had been hatching three or four weeks, and would continue for several more. They reach their full growth in ten weeks or less, weather conditions being favorable. The female, when full grown, attains the length of an inch and a half; the male is considerably smaller. When full grown they are of a very dark gray color, with rows of colored tubercules from which grow long hairs. From the second to the sixth segment these spots are blue, the next six red.

This is the only injurious stage, and advantage is taken of its habits to destroy it. As the caterpillars only feed at night, and seek some crevice in the bark or hole in the tree to hide by day, a shelter is furnished them in the shape of a burlap band around the trunk, under which a large percentage of the caterpillars seek shelter. These bands are examined daily, and the caterpillars destroyed. At this season spraying the trees with arsenate of lead in proportion of ten pounds to one hundred gallons of water is very successful. When the caterpillars are small they spin down from the trees on long threads and are blown about by the wind, catching on vehicles and being carried off to start new colonies. These small caterpillars were often found on teams and carriages in front of a livery stable in this city where trees were infected with gypsy moth.

Cars are continually passing through infested districts and are liable at any time to carry these caterpillars to suburban towns and villages.

When the caterpillars have attained their full growth, they change to lively brown pupæ and hang in great wiggling bunches from trees, fences, and other supports. The pupæ of the female is larger than the male, and all emerge as moths in from ten days to two weeks. The male moth is a small brown lively insect, flying only in the daytime. The female is a large white moth, measuring from two to two and a quarter inches in expanse, pure white, with black markings. Although the female has well-developed wings, it does not fly at all, often emerging from the crysalid and laying its eggs as close as possible to the abandoned crysalid. The eggs are laid from the latter part of June to September. It is claimed that the male moth can scent a female at a distance of half a mile, and colonies of gypsy moths are often found by observing the male.

The gypsy moth is at present in the egg state, January 5, 1905, and one of the easiest in which to destroy it. They are abundant on the west side, and a few have been found on the east side this year. They are also found in the town of Cranston and Johnston, and have been reported in Newport.

Up to date, the moth has not been found in any heavily wooden districts in Rhode Island, which makes the task of destroying them a comparatively easy one, as compared with Massachusetts. This was one of the worst features of the work in that State, as there it was necessary to cut down entire groves and burn over great tracts of brush land. It was necessary to take down stone walls, which were in very bad condition, in order to get at the eggs of the moth. Here the moth is confined to shade trees on streets and in yards, and to orchards in various parts of the city.

If immediate advantage is taken of the present state of affairs in Rhode Island, a complete extermination can be effected in two years;

but if allowed to continue to increase and spread, it will become a very serious problem to the State. The moth at present is to be found within a short distance of Roger Williams Park and several heavily wooden localities, from which strenuous efforts should be made to keep it.

GLANDERS.

BY JOHN S. POLLARD, D. V. S., STATE VETERINARIAN.

During the past year the number of cases of glanders and farcy that have been brought to my attention in this State is so much larger than during the previous year that I am prompted to say a few words in regard to this dread disease, hoping, by so doing, that it may be of direct benefit to all those who are not conversant with symptoms at the present time. In the first place, it must be stated that glanders and farcy are caused by the same agent, and in reality are one and the same disease, differing only in name as regards the particular organs which are involved; *e. g.*, if located in the mucosa of the respiratory tract it is known as glanders, and when the skin and superficial lymphatic glands are affected it is termed farcy. It is one of the most dreadful diseases that the equine animal is subject to, and in all its various forms and conditions is a menace to the public health, for it is contagious, and is communicable to man, the dog, cat, and guinea pig, and has been known to affect an entire stable of horses in a very short time as the result of harboring an animal that had contracted the disease, in the vain hope that the diseased animal might recover from the disease; but these experiments have been costly to the owners and should never occur, for it is useless to try and cure the disease, although it is tried in many cases. In one case in particular, an animal that I killed was the cause of the owner's death by blowing a small portion of the discharge from the nostril into the man's eye, and this is a condition that all are exposed to who have the care of animals suffering from this disease.

It is one of the oldest diseases of which we have any account, and can be traced back hundreds of years, and having since then caused a stupendous monetary loss to the nations of the world. This disease is caused by a microbe which is known as the bacillus mallei, and this bacillus is of microscopic size and is found in the discharge from the nostrils, and in the pus of farcy ulcers; consequently it is of the utmost importance that great care should be exercised by those who are brought into contact with these cases; for if the person having charge of an animal who may be suffering from this disease has a cut or wound upon the hands, and is so unfortunate as to become inoculated with the discharge, the chances are that death will soon claim him for a victim.

The symptoms may be enumerated as follows: In chronic glanders the animals that are affected are in the majority of cases those that are in a state of debility, either from a long continuance of illness or from lack of vitality incidental to old age, but this form may attack any animal. The peculiarity of this as well as other germ diseases is that it may be carried in the system for many weeks without any outward symptoms, and may be the source of infection to others that may come into direct contact with it. Animals are known to have worked for a considerable length of time with this disease and remained in good working order. As in all increased temperatures, we find the disease is ushered in by rigors which may not be observed at the time, but the temperature continues to rise and in a very short time a discharge from one or both nostrils takes place, which at first may be of a watery character, but later, as the disease progresses, it assumes a thicker and more viscid consistency, adhering closely to the nostrils. Usually the coat is dry and unthrifty in appearance, and the animal may or may not lose flesh rapidly. The membrane which covers the inner part of the nostril at this time assume a pale leaden color, and the formation of small elevations will take place, and as time elapses burst and become ragged ulcers, and if the animal be allowed to live, the lining membrane, which extends from the nostrils to the lungs, becomes a mass of ulcers. The sub-maxillary lymphatic glands which are situated under the lower jaw are enlarged and indurated owing to the large amount of poisonous matter absorbed from the vicinity of the disease. The discharge from glanders is at no time offensive in odor, unless the ulceration has eaten through the membrane and involved the turbinated bones; if this has occurred, the odor is very offensive indeed. If the above symptoms are noticed, it goes without saying that it is glanders.

In the acute form it is said the period of incubation ranges from four to fifteen days, and in appearance is much the same as glanders in other forms, although the discharge may be more abundant; and in many cases we have serious lung complications accompanied by fœtid breath and a more or less serious hemorrhage, and in a case similar to the one described above the animal presents a sorry sight and very soon dies.

Farcy, as I have before stated, is caused by the same identical agent as glanders, and in fact is glanders in every sense of the word, differing only in its location; and in many cases an animal has both glanders and farcy at one and the same time. Farcy may also occur in an acute or chronic form. The symptom that is usually observed in this disease is a swelling of the hind limb from no apparent cause. Perhaps the animal was placed in the stable after the day's work in his usual good condition, and when taken from his quarters the following morning it is noticed that one of the hind limbs is somewhat swollen, and he is moved with some difficulty; and in many cases it is looked upon by the owner as an injury brought about perhaps by getting cast in the stall, or may be a wrench of the limb caused by lying down or getting up during the time the animal has been confined in the stable. If he is accustomed to treat his own animals for what to him appears nothing very serious, he usually starts for his bottle of liniment and proceeds to make a generous application; but after a few days the disease instead of abating becomes more manifest, the limb becomes very painful, and after a short time the swollen lymphatic glands burst and become ulcers, and discharge an abundance of unhealthy fluid. These ulcers may heal, but not properly, and if they do so are very soon followed by another outbreak, which is not always confined to the limbs, but may cover the whole body. I have observed in many cases the swelling occur in one of the fore limbs, to be followed in a very short time by a swelling of the sheath or udder, and later the hind limbs have become involved. In the early stages it may also be mistaken for lymphangitis by those who have had little experience with farcy.

As no treatment of these diseases is permissible, it of the greatest importance that owners, or those having charge of them, should forthwith notify the officials having charge of these contagious diseases, so that they may remove them at once, for by so doing the danger is removed from all other animals as well as from human beings; for at each and every stage, and under all conditions of this disease, it is highly contagious.

Hoping this may be of benefit to all interested in this subject, I shall be amply repaid for time consumed in preparing this short paper if it should be the means of saving one human life from contracting this disease.

THE SAN JOSE SCALE.

It is safe to say that the loss to farmers, market gardeners, fruit growers, nurserymen, and private owners, by the ravages of the San Jose scale in the past five years, in Newport county alone, has amounted to many thousands of dollars.

The pest was first introduced here on nursery stock several years ago, and has spread rapidly; the average rate of increase from a single female, according to experts, being computed at over three billion in the course of one summer, to which would have to be added those arriving annually on fresh importations of stock. These, owing to the lack of protective laws such as are in force in nearly all of the states, are admitted without let or hindrance. These same laws referred to hinder our dealers from shipping stock into States so protected, the transportation companies refusing to accept such goods. The only course open is to ship in car-load lots, or falsify and mark all stock as "evergeens," which are free.

Nurserymen have lost heavily by having to burn large blocks of infested stock, particularly of fruit trees, also many kinds of ornamentals, the raising of such stock being given up entirely; orders for same having to be supplied from outside the State. It is to be feared that unless the pest is suppressed, the planting of fruit trees will be given up entirely. As it is, many of the peach orchards which were in good bearing condition three years ago have been rendered unproductive, entailing great loss to the owners and a shortage of home-raised fruit in the local market.

This may appear to be a dark picture, but is not overdrawn.

The insect itself is a very small creature, about the size of a pinhead, and is of a greyish color, giving to a badly infested tree the appearance of having been coated over with dampened ashes, the product of white-ash coal; to a novice this is not noticeable, the stunted appearance generally being attributed to blight.

The most effective remedies are those which can be used only while the trees are dormant, as damage will result if the work be done after the buds have commenced to swell. Crude petroleum has been used to some extent for this purpose, but is not to be recommended on account of its liability to injure fruit buds. The lime, salt, and sulphur mixture made according to the original formula gave good results, but owing to the length of time taken to prepare, is likely to be superseded by the new method given by Prof. J. B. Smith in the American Gardening of February 13, p. 1Q3, which is as follows:

"40 lbs. Lime.

"20 lbs. Sulphur.

"15 lbs. Salt.

"Boiling water .was poured upon the sulphur and a vigorous stirring given it. The lime was put in a barrel and boiling water added, then the sulphur and water and the salt put in and the barrel covered. In the heat and turbulence of the slaking the combination was effected. This done, sixty gallons of cold water were added and a good stirring given and it was then strained into the spraying machine and used at once."

The Connecticut formula, which Prof. Britton says is as effective as the above, is:

"10 pounds sulphate of potash.

"10 pounds lime.

"20 gallons water.

"Dissolve the sulphate in warm water and with this slate the lime.

"Mix thoroughly and add the water."

Another remedy, which, however, we have not tested, is:

One pound caustic soda to six gallons water.

For use in the growing season, kerosene emulsion is the most effective, safe, and inexpensive remedy of which we know. In spraying, it is important that every part of the plants sprayed be reached with the mixture. The work should be done on a calm day, and not while the trees are frozen. When using caustic mixtures it is well to smear the hands over with oil, or something of that nature, to save from burning.

Any ordinary spray-pump will do the work, but one having the working parts of brass can be used for fungicides, as well. For shrubs and small trees an ordinary hand-pump or garden syringe will do the work.

What is needed at this time is, that the people should be waked up to intelligent, general, concerted action.

ALEXANDER MacLELLAN.

NEWPORT, RHODE ISLAND, Feb. 20th, 1904.

POULTRY CULTURE.

BY E. C. TEFFT, WAKEFIELD, R. I.

The last twenty years have seen a complete revolution in the ideas which poultrymen have of the preparation needed for the successful breeding of poultry. Breeding poultry is no longer a temporary occupation designed to fill in a few vacant months or years until a more profitable occupation can be found in other callings. A superior class of young men and women are now seeking for the best methods to be employed in the rearing of poultry, with the purpose of making it a permanent business. If the next generation does not see a great advancement in the way of carrying on a poultry plant and a revolution in our ideas in managing poultry, the fault will not be with those who are now earnestly seeking after improved methods of instruction. It must lie with those who at present are employed to give instruction. There is, therefore, an urgent need of emphasizing the difficulties which students seeking poultry instruction often have in getting a correct knowledge relative to breeding poultry for profit. It is so popular and inspiring to-day to talk in general terms, and to lay out a broad and easy road for the student to follow, that the obstacles to its realization through present means are entirely overlooked. The amateur in poultry culture is often started on a road, pleasant to look at, and which seems to lead directly to the desired results, and yet, if followed but a short distance, it sinks into some by-path obstructed by difficulties that only the most persevering can overcome. There rests, therefore, upon poultry educators a deep repsonsibility for the instruction they impart to the poultry student, who is always more or less uncertain of his preparation and ability to go into the poultry business.

I have made use of this introduction in the hope of causing a partial realization of the difficulties that beset the young poultryman in starting a poultry plant, and, if possible, especially to make clear the hindrances to be met with in the science of poultry breeding. It may seem strange at first for one to ask your attention at the start to the many obstacles to be overcome in the rearing of poultry, an occupation which may seem to be a very simple and easy one to engage in; but let me assure the one who is about to launch into the poultry business that there is no business that requires a more detailed work and a more comprehensive knowledge pertaining to business methods than the one to which I now ask your attention, and I have planned this paper in the hope of showing the amateur the importance of starting in the business in a business-like manner. Being thoroughly convinced that whoever desires to become a successful poultry breeder will have cause to regret if he does not make himself familiar with the work at the beginning and get all the light possible to help him at the start.

The question may here arise, with one who is about to start a poultry plant, whether it is wise to put much time, money, and labor out to find out how to care for a few hens. Let Secretary Wilson's annual report for 1904 answer the above question. He there tells you that the steady advance in poultry leads to some astonishing figures. Most certainly they do seem astonishing when we find that one hundred and twenty-three billions of dozens of eggs were produced from farmers' hens in the year 1904, and at the high average price of the eggs for the year the hens during their laying season lay enough eggs in a single month to pay the year's interest on the national debt. Statistics show us that the annual egg product of the United States exceeds in dollars and cents the value of all the gold and silver mines therein. The output is worth annually over $145,000,000. In 1902 no fewer than 16,000,000,000 eggs went to market in the United States, at an average price of fifteen cents per dozen. Formerly

A Poultry Yard with Fruit Trees in it.

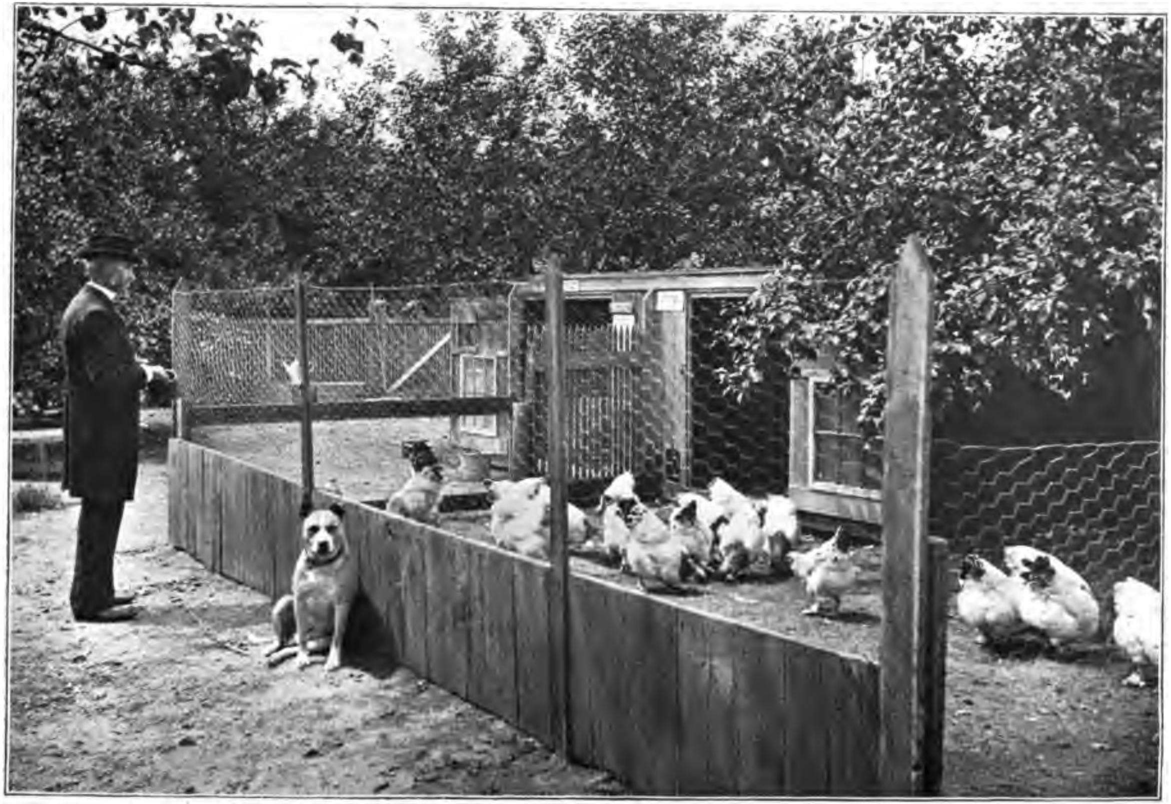
this country imported enormous quantities of eggs, but now it exports far more than it obtains from abroad. The American hen is protected by the Dingley tariff. A duty of five cents a dozen is imposed on foreign eggs, enabling our hen to realize a profit of four hundred per cent. annually for hen owners.

Taking the above facts into consideration, I ask you who read this article if it is not wise to learn how to take care of a few hens? It is claimed by good authority that there are two hundred and sixty-one million domestic fowls in the United States. A vast majority of them are kept on small farms. They gather their own subsistence very largely, and receive but little care from their owners, which explains why eggs are so cheaply produced. It is an easy matter to care for a few hens or to rear a few hundred chicks, but to rear poultry in large numbers, either for eggs, meat, or for the show room, is quite another thing. Let me here say, based upon forty years' experience in the poultry business, that I am firmly of the opinion that the one who is rightly educated in poultry culture is the one who will secure the largest and best results from his labors. The law of the survival of the fittest is universal in its application. It will apply to breeding poultry as well as to any vocation among us. Ignorance and indifference have no place upon the poultry plant. The poultryman, to be successful in these days of sharp competition, must be educated in his line of work, as it has now become a profession and in the near future will be placed upon an equal footing with law, medicine, divinity, architecture, and other professions.

Many are turning their attention to poultry raising, either as a regular business or as a side branch to furnish a living. The numerous small poultry plants that are now scattered all over New England, the Middle States, and the great West, are a very important item, in their aggregate, to be considered when we undertake to discuss the magnitude of this branch of American rural industry. Every year these plants are increasing, both in number and in proportion. Those who are not directly interested in some way with poultry culture have no idea of the extent of this industry. Scarcely a small farmer in Rhode Island now carries on his farm without giving a greater share of attention to his poultry than he did a few years ago. But there have also of late been springing up, at all points, numerous new hands in this business: Young men with small means and a taste for the work; middle-aged men who have found the calling in which they were engaged unproductive; old men who have become worn down in other pursuits where they have met with pecuniary losses and disappointments; both men and women of all ages out of health who can not endure indoor work, who believe that poultry-keeping will pay if they start understandingly and do their best to learn how to do it.

That the poultry industry is remunerating is no longer problematical, although this question is being continually asked by those who are about to embark in the business. If it did *not* pay, how is it that we have in this country at the present time hundreds of breeders who have been constantly and uninterruptedly engaged in this work for a score or more of years ? And it is with great pleasure that we can assure the amateur to-day that some of the best men of the land are now engaged upon a larger or lesser scale in breeding thoroughbred poultry, men who have means, and are scientifically educated, and they not only show a willingness, but are earnest in their efforts to advance the interest in poultry culture. These are but few of the large number of business men who are to-day devoting their time, their money, and their skill to this business.

There is a constant and gradual increase from year to year of practical poultrymen. Fifty years ago they could have been counted by dozens, later we could enumerate them by hundreds, to-day we count them by thousands, scattered all over the country in every State, county, and town within the limits of the United States. In buildings, in stock, and in the products of this industry, millions of dollars are invested annually in one way or another. Does this not prove that poultry industry to-day is worthy of all the attention it is receiving in all parts of the country, where enterprise and advancement have entered? At the present time there is no vocation that offers



A Breeding Pen of Light Brahmas.

more inducement to the man or woman who would earn an honest living. We would, therefore, in the light of these facts and many others, advise those who can to embark in this work. Go about it in a careful and sensible manner. Obtain, if possible, the counsel of our reliable and most successful breeders. Do not take everybody's advice, but look to those to whom you have a good right to look. Should there be one who reads the above heading to this article who thinks he knows all about poultry culture, to such allow me to say that I have been engaged in the breeding of poultry for many years. I have bred nearly all varieties of poultry, both for the market and for the show room. Candor compels me to say that I have received more knowledge about poultry culture—than I ever knew before—since I thought I knew it all. I have no desire to discourage the beginner in poultry culture by pointing out to him his small chances of making money in his first season, but it is all-important that he should realize that the mere purchasing a fine breeding pen of fowl, or a few settings of eggs, no matter what the variety may be, will not raise him at one step from the bottom of the ladder to the top. In commencing a business like the breeding of poultry, it is far better for one to realize that success—that is, a maintenance of success and not merely a lucky success for a few years—depends entirely on the thought, care, and attention a man puts into it. Many who have started in the poultry business follow it only for a few years and are compelled to give it up as a failure. A good many reasons may be given for these failures. It is often claimed by some, especially is this true of breeding thoroughbred poultry, that they were crowded out by old professional breeders; others, that bad luck and bad seasons have caused the mischief; while many step aside, calling it an unprofitable business. But if we are called to express an honest opinion, it would be that in nine cases out of ten the unfortunate beginner never started in the right way; never realized at the commencement that success or failure depended upon his own efforts to secure a sufficient amount of knowledge to carry on the business upon business methods. And more especially should this fact be taken into consideration by the one who commences to breed poultry to-day—whether he breeds for eggs, for meat, or for the show pen. He must bear in mind that success in poultry culture depends largely upon good management, as does any other paying business. To breed poultry with profit, it is not only necessary to commence with good stock, but he must read, study the needs of his stock, consult the best published books on the subject, subscribe for and peruse his poultry paper attentively, examine the reported experiments of the best breeders, etc., and thus learn what he *must* know in order to render himself, in course of time, an expert in his business.

Under these conditions and conducted in this way, poultry culture pays, not only in America, but in Rhode Island. It matters not whether the object is to raise good fancy fowls as future breeders and for the show pen or whether fowls for marketing purposes, the proper method of making the business profitable is the same. We must know something about the requirements of the stock; we must attend to their wants regularly; we must secure information as to their qualities, their habits, and the daily needs to keep them in a thriving condition. Under this management we may meet with success and shall find that poultry culture pays, whether we breed fancy stock and but little of it, or whether we raise fowls by the hundred and thousands for the profit from their eggs or for their meat. I have no desire to discourage any one who is about to engage in this work, for I feel confident that poultry farming is a profitable and an agreeable undertaking. As a means of obtaining a livelihood, it has many advantages if properly conducted. Dressed poultry and eggs are always in good demand in our best markets. Both chickens and eggs may be easily produced in large quantities, if the parent stock is rightly, economically and steadily managed, as we must manage and conduct the details of any business or calling to succeed in it pecuniarily. As in all other business projects, the work of making poultry profitable is an undertaking requiring time, study, patience, and good judgment to perfect. The best results can not be reached in a year or two of careless, haphazard management, and those who

Another View of Breeding Stock.

start with this idea will sooner or later be disappointed. The men who have succeeded best in this calling are those who began systematically, who followed up their work earnestly, and who practically sought out the wisest and most natural means of turning to good account the results of proper and rightful effort towards a real improvement of the domestic poultry of this country. Why we have the stately light Brahma of to-day is largely due to the earnest efforts put forth by such menas E. C. Comey, Philander Williams, I. K. Felch, Todd, and a few others. In a similar way the beautiful Partridge Cochins have been perfected by such fanciers as W. H. Bracket, of Boston, and C. H. Bradley, of Connecticut; the Dark Brahma by H. A. Mansfield; the White Leghorn by Pilkin and Smith; the Brown Leghorns by Kinney and Boney, of Massachusetts; the Plymouth Rocks by some half a dozen leading breeders of Massachusetts and Connecticut, and several other varieties that have been brought up to a high standard by persistent and careful breeders, none of whom have made themselves eminent save through careful, constant, devoted efforts in the right direction, giving their time continuously to the production of their favorite varieties of poultry. I might mention many others that have met with success in coming to the front, but I have named these because they have taken the lead. They have learned some of the chief secrets in fowl breeding through a love of their occupation and by active intelligence and constant devotion to the pleasant work. Through such means alone can we, any of us, similarly succeed in the poultry business.

It is evident that no specific or general rule can be given which will be applicable to all beginners in the poultry business, since taste, needs, and desires of the beginner vary widely; nevertheless a brief discussion upon the subject may prove of value. In starting a poultry plant, whether a small one or a large one, many things should be carefully considered before making the start. Those who expect to secure their income from poultry alone, should lay particular stress on the following things: *First.* Healthfulness and the surroundings; quality of the land, water supply, and the markets. It is seldom that a selection can be made that fulfills all the desirable conditions. I would advise anyone about to engage in poultry culture to give special attention to topics here enumerated. Location, quantity of land needed, and quality of the soil; breeding stock, houses and yards, and see that you have secured knowledge of the business sufficient to warrant your beginning. Study them one at a time, as you are about to select your location, purchase your stock, to build your houses and arrange your yards, and last, but not least, see to it that you have knowledge of the business sufficient to enable you to commence in a business-like manner.

LOCATION AND QUANTITY OF LAND NEEDED.

In selecting a site for a location for a poultry plant, the nature of the soil, drainage and slope of the land are of great importance, and are great factors toward keeping the chicks and mature fowls in a healthy condition. Land sloping to the southeast or southwest is the most desirable. Heavy clay soils, without drainage, can not be used profitably for poultry runns, neither lands that are nearly all sand, although the sandy is dryer and more healthy, but such land lacks the fertility to grow vegetables and fruit—two very helpful auxiliaries in poultry farming, especially in Rhode land.

As a rule many poultrymen use very little judgment when building poultry houses or laying out yards for their birds. They will often choose a site because it is handy to get to, or because out of the way of the buildings or land they wish to keep for other purposes, and they seldom take into consideration that the sites selected are low and damp at nearly all seasons of the year. Dampness is one of the greatest causes of disease and disorders so prevalent among poultry, and if breeders would carefully guard against dampness they would not be called upon to bear the many losses of fine birds which occur so frequently through the dreaded diseases, roup and cholera. Before leaving the subject of dampness, it may not be out of place to emphasize the necessity of securing a location, if possible, where no foul water is allowed to stand. Modern science has revealed the fact that a large number of diseases are introduced into the system of the chick by drinking foul water. Chemists state that eighty-four per cent. of the egg is water. In view.of this, fowls, to lay well, must be furnished with an abundance of fresh water. Consequently, we readily see the necessity of securing pure water. Drinking-vessels should be thoroughly cleansed as often as twice a week, and, if possible, so made that the hens can not stand in them. It would not be wise to locate near woodland and swamps, as you would be annoyed by too many poultry enemies, such as hawks and other enemies of the young chicks. It would be well to locate near good markets, as the expense in getting your eggs and dressed poultry upon the market daily would be quite a drawback if the distance was many miles, and if you are in some out-of-the-way place, back from railroad stations, buying people would not so often visit your place, especially if you were dealing in thoroughbred poultry. It is true that one starting in the poultry business oftentimes feels that he must secure cheap lands, from the fact that he has but little means to start with, and lands are secured that are situated far from the markets and railroad stations, lands that are stony, wet, and not easily tilled; generally such locations are dear in the end and often lead to a failure in the business. Taking all things into consideration, most certainly a rich, gravelly loam poultry-yard, sloping to the southeast or southwest, near to the markets, easy to get to, where pure water can be easily secured, land that all kinds of vegetables and fruit do well on is the most desirable place for growing chicks, and by selecting such a location you are taking the first step towards warding off disease. Cases of cholera in fowls or gapes in chicks are very seldom known on dry, well-drained land. The more this fact becomes known, the better will a dry, rich, gravelly-loam location for a poultry plant be appreciated. As to how much land is needed, depends somewhat upon the extent of the business. I think it is a mistake to invest money in a large tract of land for poultry culture, and not occupy more than one quarter of it. I feel quite confident that as much money can be made from hens on from two to four acres as on double the quantity of land; especially is this true where the fowls get constant attention, which they *must* have to be made profitable. Four acres will comfortably quarter six hundred fowls and allow sufficient land for a dwelling house, lawns, barn, and other necessary buildings. And among the fowl runs can be planted fruit trees which in a few years will yield enough income to pay for a large portion of the feed for the breeding stock. Four acres are enough for two men to handle to best advantage, and two acres enough for one man.

During the past twenty-five years I have visited a great many successful poultry plants, and in the majority of cases the fowls kept and their houses and runs did not occupy more than from two to four acres in all. I have also visited plants where the same number of fowls were scattered over fully seventy-five acres of space, with no advantage whatever, but with the disadvantage of much loss of time in going the rounds several times a day to feed, water, and collect eggs. With proper houses, with small runs to attach them together, with good size runs, say fifty feet wide and one hundred feet in length, the fowls will be more together and the work of feeding and caring for them will be greatly reduced. Taking all the environments connected with poultry culture, I should advise starting with a small plant in a location where it could be enlarged if found necessary, always keeping in mind that the quantity of land needed is just the amount that can well be taken care of.

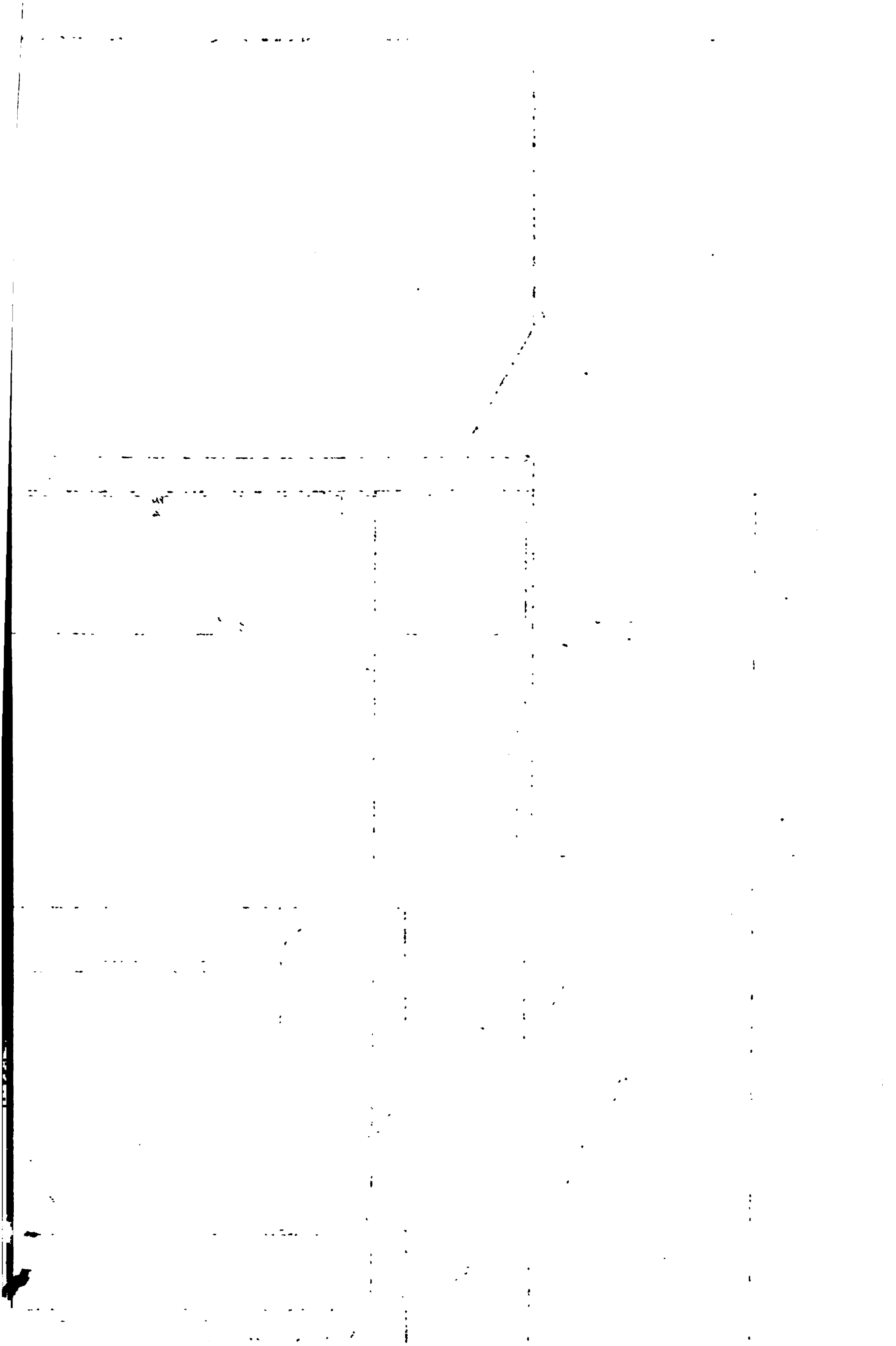
QUALITY OF THE SOIL.

As to what quality of soil is best is a question worthy of attention in the establishment of a poultry plant. It is frequently claimed that any kind of soil will do for a poultry yard. It will, if money and labor enough is used to make it do. But a strong gravelly loam is the very best, as it affords good drainage, the sand and gravel taking in the water, the loam retaining the moisture. Such land generally gives good results in the growing of grass, clover, rye, oats, or any green stuff, and on this kind of soil most every kind of vegetables can be grown with success, and fruit trees and small fruits do remarkably well, especially plums, pears, apples, blackberries, currants, and grapes. If a man of energy has three acres planted with such kinds of fruit as will do well on his soil and keeps from three to four hundred laying hens, well housed, well fed, and well cared for, brooding houses sufficient to rear six or eight hundred chicks at one time, he has all the land he needs and all that himself and a hired boy can attend to, and can from this, if he is a business man and likes this kind of work, make a good comfortable and healthful living.

I have visited several small plants within the past year, not covering more than an acre of ground, where hundreds of fowls are annually raised and marketed with profit, and these plants have been in operation for a number of years, from which the owners have realized handsome returns. I am well aware that it is claimed by many poultrymen and farmers that poultry can not be bred with profit by being confined in small pens. Nevertheless, I am firmly convinced that upon village lots and in small runs there can be no excuse for not keeping and rearing fowls successfully and profitably. In almost every village you will notice in the rear of the house a little garden patch or a small hennery, oftentimes containing from ten to twenty-five or thirty birds, and while the number of these poultrymen seems small, in the aggregate it is quite large; for if we take into consideration that seventy-five or one hundred families comprise a small village not covering more than fifty or sixty acres of ground, and each family keeps a yard of ten or twenty-five fowls, and rears from fifty to one hundred chicks, this causes no surprise, and they generally do well. Allowing fifty families out of one hundred to raise forty chicks and keep in stock twenty fowls, you can count up at the end of the year three thousand birds. Undoubtedly these birds have been kept and reared on a space not covering more than five acres of ground, which would give the number of six hundred to the acre. Now, the question comes, if these birds are treated the same, will they not do equally well if owned by one person? Fowls are oftentimes kept by business men, the care of which serves to render their leisure hours agreeable, and from which the family is furnished with many dozens of fresh eggs in the course of the season. Thus fifteen or twenty hens may be kept without much trouble to the keeper, from which may be had during the year a hundred or more dozens of nice fresh eggs and a score or more of fine chicks for broiling, and at least twenty fine pullets for the next year's use. Why should not the mechanic, clerk, or city business man avail himself of this economical plan and furnish himself with pleasant recreation for his leisure hours, as well as profit in the undertaking? It has been demonstrated beyond a question of doubt that poultry can be reared with little expense by nearly every housekeeper and can be made to pay a hundred fold on the investment. Not only can this be done by our rural population, but by those living in cities and villages. Having had nearly forty years' experience in rearing poultry in a village, I can speak understandingly on the subject. It requires but a small space to keep twenty fowls. A lot twenty by sixty feet, divided into two lots, with a house eighty by sixteen feet, is amply large if proper care is given, and the pleasure it gives anyone to know that with a little judicious management his table may be supplied with birds of his own rearing and with fresh eggs the year round can well be imagined.

BREEDING STOCK.

With regard to the breeding stock: Be sure that you start with good healthy stock. Do not buy cheap breeding stock to commence with, no matter what the variety may be. Unless our time and money invested amounts to nothing to us, and we are willing to spend year after year experimenting and hoping by chance to meet with success in breeding good birds, we had far better stay out of the business. There is but one right way to begin, and that is with strong, healthy, well-matured birds. A pair of strong, healthy fowl are worth more than a dozen that are always droopy or unproductive, let the breed be what it may. At the present time there is no excuse for commencing the poultry business with cheap, mongrel stock when you can secure good, healthy, thoroughbred stock at reasonable



prices. When we come to know that it has taken years for our best breeders to bring their birds to their present state of perfection, does it not seem unwise for an amateur to imagine that he can start with poor parent stock and succeed at once? Debilitated, degenerate stock will never produce healthy, young birds, and it is more than useless to hatch thousands of chicks that come into the world with enfeebled constitutions and in no condition to live.

George P. Burnham, author of "Secrets in Fowl Breeding," says that it is idle to attempt to breed good chickens from poor specimens or from imperfect stock, no matter what the *kind* of fowl may be that is chosen to begin with. But let us not stop here. Having secured a suitable location and good, healthy stock to start with, see that we have good practical houses and well-arranged yards.

HOUSES AND YARDS.

In calling your attention to the house question, much may be said as to the size and style of a house for poultry. I feel confident in saying that the house that is warm, roomy, and convenient for both the poultry and the attendant, perfectly dry and amply ventilated and lighted, is the model house for poultry to do well in, be the architecture what it may. Such a house is practical, and if properly located, good returns are the rule, all other things being equal. In building a house, I would not pay too much attention to outside beauty; for I can assure you that beauty in a hennery is not so much measured by ornamentation on the outside as by conveniences and comfort within.

It is only within a few years that poultry houses have received much attention, but the love of order on the one hand and the dread of thieves, cats, and rats on the other, have made it desirable to build good, substantial poultry houses. Well has it been said by one writer, who is authority in the planning of farm buildings, that too little attention is given to providing proper protection for poultry. While elaborate and costly structures are not required, they should be stormproof, free from cross-drafts in cold weather, have ample floor space, and be convenient for both the attendant and the poultry. The last point is one worthy of much attention, since a very little saving of time and labor each day of the three hundred ond sixty-five amounts to a considerable saving in the year. This can be accomplished by building your houses with a view to convenience for both the poultry and the attendant at the start. It will not pay to build expensive or ornamental houses; they should be neat and commodious, and constructed with a view of reducing labor to a minimum. The outside of the house is a matter of taste, but inside the comfort and well-doing of the poultry must be the only consideration. The style, size, and cost of a house must be determined by the builder's needs, taste, and pocket-book. There is no "best house" for all situations and all persons. But when building your houses, always bear in mind that while the outside of a house may be a matter of taste, the conveniences and comfort of the poultry should be well looked after inside. If the foundation or flooring of your building is damp, it will be impossible to keep your birds in a healthy condition, even the most hardy breeds, and money spent in securing a dry flooring space will save many times the amount within a few years. If the soil is heavy and damp, I would advise excavating to the depth of two feet and filling in the space with small stones and gravel, pressed down hard and covered with sand. See that your floor is six or eight inches higher than the ground outside your house. See that you have the needed appliances inside the house to work with to the best advantage. What I wish to be understood here by the term "appliances" consists of such articles as roosts, nests, dust-boxes, feeding-dishes, drinking-fountains, grain bins, medicine boxes, and in fact every little convenience that is needed for use in the care of poultry. I would have all the appliances movable, in order that the house may be more easily cleaned. I prefer the platform method, as I find it to be a great labor-saving arrangement, while at the same time it allows the fowls more floor space. The house illustrated is what I would call a model fowl-house for poultry to do well in. It is twenty-four by thirty feet in size. To avoid all dampness in the building, the soil was removed about two feet and the space filled in with cobble stone and gravel, which makes a dry and healthy floor. The underpinning is posts set three and one-half feet deep, eight feet apart. The flooring is raised eight inches higher than the outside ground, preventing the surface water from outside getting into the building. A plank one foot wide is spiked to the inside of the posts and let down into the gravel six inches, making it warm and tight; such an underpinning does not allow any harboring space for rats. The building is shed roof, sides three feet high. A hall three feet wide runs through the center; on each side of the hall are the pens, three on each side, ten feet square. The partitions between the pens and the hall are matched boards two feet high, finished up with wire netting. Each pen has two windows, one on the side and one in roof. By this arrangement, free circulation of air can be secured through the whole building. The roosts are parallel, with shelves beneath for the droppings. The nests are placed under the platform, with doors opening from the hall for removal of eggs without entering the pens. Food and water can also be given from the hall, both being left behind lattice work, ensuring perfect cleanliness. A ventilating shaft comes down through the roof to within six feet of the floor. Feeding, watering, collecting the eggs, and letting out the fowl from the six pens can be done without entering either pen. If you have never planned a house in this way, you would be made happy to see how much easier it is to care for poultry, to say nothing of the amount of time and labor saved. The house fronts southwest. This frontage takes the rays of the sun all through the house.

The successful poultryman must be a systematic man. He must plan his poultry houses with an eye to economy of time, that most important problem to the poultry-keeper—with whom the steps are so many and whose profits so directly depend upon precisely the number of minutes or hours that he can put into it aech day. He must arrange his buildings and yards in such a manner as to group them about a center, so that the attendant can at once, and with the fewest possible steps, visit any one of them. In a great measure, here lies the success or failure of the one who starts a poultry plant, whether he starts in a systematic manner or jumps into it in a thoughtless way of doing things. Your houses should be so located that the sun's rays may reach the occupants early in the morning, at mid-day, and late in the afternoon, houses that can be closed up tight if need be, or ventilated and made airy when necessity requires it, houses that are roomy and yet warm and dry, bearing in mind that such houses are great preventives of diseases.

KNOWLEDGE OF THE BUSINESS.

There is one very essential point to be taken into consideration in starting in the poultry business, and that is, knowledge of the business. I speak of this because without it your business must suffer and will soon terminate in a failure. What would we think of a man starting in the drug business and expecting to make a success of it, when he or his clerk knew absolutely nothing of the business? We would naturally put him down as a crazy or silly man; but how much more wisdom does the man show who pursues exactly the same course in commencing the poultry business? Many who engage in the breeding of poultry do not know how to take care of their stock, and I feel quite confident in saying that most of the trouble from disease in the poultry yard has its origin in the poultry-keeper not knowing how to feed, when to feed, what kind of food to give, and in what condition it should be given; and I believe that I do not overstate in saying that ninety per cent. of the sickness in chicks and fowls is caused by dirt, neglected, damp quarters, bad ventilation, bad water, and improper food. The main object which I wish to have you keep in view is, that the serious diseases which attack our poultry are largely preventable by good management and having knowledge of the business. But it is possible that one may have knowledge of the business, good location, good healthy stock, and good houses and runs, and yet not meet with success. A great many who have the above requisites imagine that they can fold their arms and the hens under such conditions will care for themselves. But, my friends, there is lots for you to do, and hard work at that. It would not be well for me, at this time, to tell you all that must be done, as care and treatment differ in different localities and under different circumstances. As we go on in the business the work needed to be done will manifest itself to us, and probably faster than we are able to do it.

There are a great many small things to do that mean success or failure, according to the way we treat them. Nothing is too small to be given attention that tends to the growth and advancement of the business. The poultryman who wishes to succeed must be a worker. He must be systematic in his work, remembering that system is the keynote to success in all branches of business; the merchant, the mechanic, and indeed all who make a success of their chosen vocation, do so by adopting a strict system of business, which is closely adhered to, even in the smallest details. The best business men of to-day are not the ones who have conducted their business in a hap-hazard manner: they are the men who have systematized their work, who make every move count, who waste no time in guessing, but have everything planned so as to mean something. We, as poultrymen, are apt to look upon the work too lightly. The idea seems too prevalent that chickens or fowls need but little care, that they will look out for themselves. We do not place enough importance upon the possible benefits to be derived from them, if properly taken care of; in fact, there is no animal that will respond as quickly to proper care and attention as fowls, or one that becomes a dead loss to the owner as quickly, if neglected. The idea is this: Do nothing haphazard. When you mate your pens for breeding, do so with a definite and fixed purpose. Know what you want, then mate to produce it. Do not use guess work; do not put just anything into your breeding yards and then trust to luck; if you do you are surely doomed to disappointment. It is a mistake that there is nothing to learn in the successful handling of poultry, or that anyone without experience can start a large plant and make a success of it. If you will take the time and pains to look into the subject, you will find that nearly all who have commenced with this idea have failed and condemned the business. If you find that you can make a small plant pay, and you like the business, then enlarge your plant and increase your stock, by using care that you do not allow too many fowls to mass together in your houses and yards.

I have found that hens of good, thoroughbred stock, properly fed on a variety of food and kept in pens containing from twenty to thirty birds, will lay twelve dozen of eggs each, per year, and raise one brood of chicks; on this basis, one hundred fowl can be made to net two hundred and fifty dollars a year. This is no boom statement. I would not for a moment wish to mislead anyone starting in poultry culture. The facts that I am giving are possibilities that are within the reach of anyone qualified to go into the poultry business. But to breed poultry with profit there must be a live, up-to-date man back of it. If there is any occupation in which a drone will fail quickly, it is certainly in the poultry business. Do not for a moment entertain the idea that breeding poultry, with success, can be carried on without work. It is work that requires constant attention, both mental and physical work. You must figure and plan ahead and work close to your figures and plans, having in mind that there is little of what is properly called luck in fowl culture. We must learn who to do, how to do it, where it should be undertaken, to make it pay. I am firmly in the belief that the poultryman of our time should have a clearly defined aim in view, at the beginning, and if he acquires some knowledge of the true principles of breeding fowls before he embarks too largely in the business, he will be the gainer in the end, and may save time, money, and patience by going forward with his work understandingly. As to the size of a poultry plant, whether of moderate or extensive dimensions, which is best and most profitable, depends upon several contingencies connected with the enterprise. I have never entertained a doubt but what either one may be made profitable if properly managed.

I have not been able in this brief sketch to go into all the particulars relative to the plans for starting in the poultry business, but you will notice that I have confined myself almost entirely to the practical side of poultry-breeding; and if the hints embodied in this article prove of any value to those who are about to launch out into poultry culture, I shall feel that I have done something towards advancing an industry worthy of its undertaking, and especially so in Rhode Island, for I am firmly of the opinion that the egg production is to-day one of the most profitable branches of agriculture that we have in this State, and it seems singular, all things considered, that more attention has not been given to the egg and poultry production, for in nearly all portions of the State the conditions are most certainly very favorable, the cities of Boston and Providence affording as good markets for the consumption of eggs and fresh poultry as there are in the world, as there has been within the past few years a constantly increasing demand for fresh eggs at good price. There are thousands of acres now lying idle that can be obtained for exceedingly low figures. In several towns of the State there are small farms, excellently well adapted to poultry raising, where the owners now find it hard work to make a living. There is not the slightest doubt but what if the farmers holding those non-productive farms would turn their attention to poultry, both for meat and for eggs, and use business methods in the management of their poultry, they would be able to make a good comfortable living and soon bring up their farms to a high state of cultivation.

Why I dwell upon this matter is because it is beyond a doubt that any intelligent business man can secure a good, comfortable living from breeding poultry in Rhode Island, and it has been my purpose in writing this article to tell you in as concise a manner as possible how it can be done.

At the present time there is no excuse for ignorance in poultry culture, with the numerous reliable books and papers devoted to all branches of the subject. It is gratifying to see how rapidly the interest is growing in Rhode Island for breeding thoroughbred stock, and the increased demand from year to year. It proves that the people are learning that it costs no more to keep *good* fowls than *poor*, and that the best is always the cheapest. It is also gratifying to know that the field is still open; the prospect was never more promising, and the legitimate fruits of good management and honorable dealing in poultry farming can be gathered in abundance by those who are able to fill their place in the calling.

NOTES ON FRUIT GROWING.

BY A. E. STENE, KINGSTON, R. I.

The New England farmer can not compete with his western brother in general farming. He must, therefore, determine what special lines his land is adapted for, then study the markets and his own liking and capabilities, and finally decide upon one or two lines which seem to promise good returns and then bend every effort toward making these a success. It is not, however, the purpose of this article to discuss the merits of different lines of agriculture adapted for specialization, but to present a few thoughts on fruit growing.

It is conceded by a great many of our foremost agriculturists of the present day that certain lines of fruit growing are well adapted to the average New England farm. This is not a universal belief, however. Many who had quite extensive orchards twenty or thirty years ago have since neglected them and have not planted any new trees to take the place of the old ones. The reasons for this condition are many. If we ask the average farmer why he does not give more attention to his orchard, he will probably tell us that the "pesky bugs" have become so numerous that it is almost impossible to raise any fruit, or he may tell us that the markets are glutted and that paying prices can no longer be obtained; labor is also scarce, and it is almost impossible to obtain the help needed in caring for an orchard. Like all opinions which are prevalent among people, there is a large measure of truth at the bottom of the statements. New fruit regions are comparatively free from injurious insects. In time, however, insects gradually follow, and at first may even become more destructive than in the older regions because the food supply is large and the parasites which serve to keep them in check in old feeding places have not been imported with them. The elm leaf beetle, gypsy moth, and San Jose scale are examples. There are many other causes for the increase of the insect and other enemies, but space will not permit their discussion here. But another reason for the decline in fruit growing, nearly as important as that of the greater abundance of insects, is the fact that the standard for marketable fruit has advanced. Fruit formerly accepted by people can no longer be disposed of, and the better grades of thirty years ago now only bring an average price in the market. Many, rather than adjust themselves to the new condition of things, have gone into other lines of farming.

Still another reason, which perhaps affects the growing of apples, is that formerly a great deal of this fruit which was not marketable was used in making cider. We read of how in the good old times farmers measured their winter's store by the number of barrels of cider in the cellar. This delectable drink is not quite so much in demand as it formerly was, possibly because of an increasing suspicion on the part of the imbibers of the beverage that cider at times contains juices other than that expressed from the substance of the apple; probably also because other potations too numerous to mention are found at every street corner or can be made at home if necessary.

The market also demands greater care in handling and packing than a few years ago. It is willing to pay well for extra labor so expended. A little care in sorting and packing will often bring a difference in price of seventy-five cents to one dollar on a barrel of apples. But in these æsthetic—if we may so term them—features of fruit production, as in all progressive elements of productive enterprises, the demand is always in advance of the supply. The great mass of people accede to new demands slowly, and those who come in advance of the procession reap a good harvest. The watchword for the future then, is, "not quantity, but quality of fruit."

The problem of labor is, perhaps, one of the most difficult to solve. Careful attention to planting and the introduction of horse power cultivation and labor-saving machinery wherever possible will do much to obviate this difficulty.

Another consideration in connection with the labor question is to so arrange the work as to give the men steady employment the year around. This will develop a better class of labor. For this purpose it is necessary for the fruit grower to carry on some secondary line of work which shall fill in the time when his orchards do not need attention. Co-operation among fruit growers in labor and in the purchase of labor-saving machinery will, to some extent, help solve a few of their labor problems.

MARKETING.

Fruit raising may be divided into two parts, growing and selling. One is as important as the other. Often good fruit fails to give satisfactory returns because of lack of care in marketing. The first requisite of good marketing is careful packing in neat, tasteful, and convenient packages. The better the fruit, the greater care should be used in packing. Fancy fruit should always be put up in gift packages. Such fruit should be uniform in shape, size, and color, and free from blemishes of all kinds. Each separate fruit should be wrapped in tissue or other soft paper. Adopt a name or trade-mark, which shall be put on wrappers and packages. Do not advertise poor fruit in this way. Apples sold in barrels, if fit to be sold at all, should be faced at both heads. Put as large a percentage of good apples in the center of barrel as at ends. As an illustration of value of facing, the following story by a Boston commission man may be of interest. A friend of his came to him one day and asked him for a good barrel of McIntosh. He opened one which had just come in. The price was $2.50. It had been carelessly packed, and the man said he would wait till the commission man got some better ones. The latter, seeing that the fruit was really of high quality, had the barrel repacked and faced. The next day he telephoned his friend that a lot at $3.50 had arrived. The man came around and was delighted with the fine apples that he obtained and cheerfully paid this price for the same fruit that he could have bought for $2.50 the day before. The commission man made seventy-five cents on the repacking. This might as well have been in the pocket of the grower.

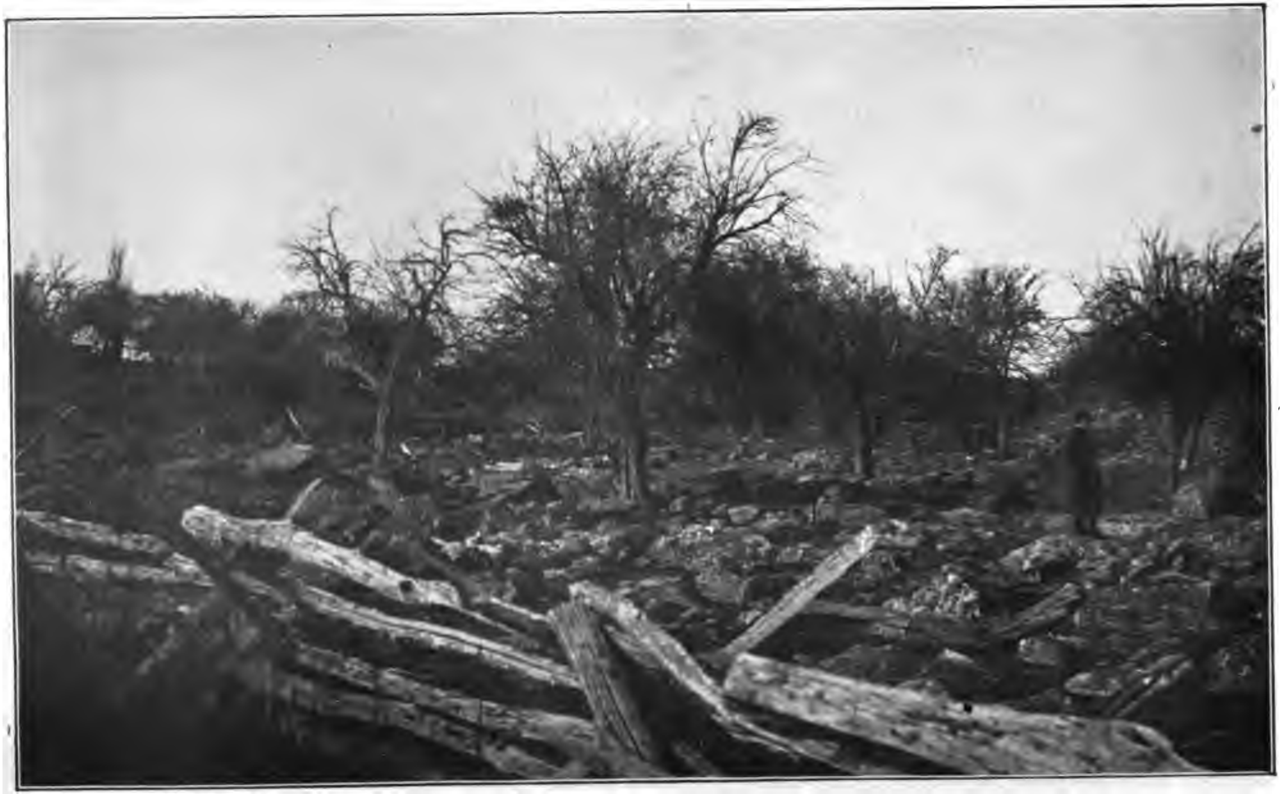
Grading fruit will nearly always pay well. A better price can be obtained for the larger size, and the smaller ones, if uniform, will nearly always bring as good price as the mixed lot would. Large specimens in a package of mixed fruit emphasize the fact that the smaller ones are undersized.

Cold storage has developed into magnificent proportions within the last few years in dealing with fruit as well as other food products. By cold storage methods the length of season of nearly all our fruit can be lengthened from one to several months, and the fruit will come out nearly as fresh as it went in. The recent world's fairs have given additional experience in handling fruit for storage. The cardinal principle seems to be: pick when just ripe, and lose no time after packing in getting the fruit into the storage rooms.

In recent years a great deal of fruit has been shipped to foreign markets, and the returns have usually been quite satisfactory. Cold storage and refrigeration have made this possible. A year or two ago, C. M. Hooker & Son, of Rochester, shipped a lot of choice Baldwins from cold storage to Liverpool and London. Shipments were made in small lots and extended from February 1st to May 25th, and brought from $4.50 to $6.12 per barrel, a handsome profit over what they would have brought in this country at that time.

A German, writing a few years ago in Berlin, bewailed the fact that American fruit was monopolizing the market to the exclusion of the native product. The reason for the greater demand for the American product he concluded to be the neater and fresher condition in which it came on the market. He advised his countrymen to try and copy Yankee methods, else they would be driven out of the market entirely. This emphasizes the fact that foreign shipments have been made, to a larger extent at least, by men who knew their business.

Passing for a moment beyond the consideration of marketing by the producer, to the selling of fruit (and some of these remarks apply



Apple Orchard among Rocks.

A NEGLECTED APPLE TREE.

Judicious pruning, spraying, and fertilizing will put it in shape again.

not only to fruit but to meat, vegetables, and other food products) by the commission merchant, the retail storekeeper, and the street vender. The fruit is transported through the street in open wagons—and the butcher's wagon is not always an exception—exposed to the dust of the street raised by the wheels and by every whiff of the wind. It is displayed for sale on sidewalks, in doorways, and often far out into the street, where fresh accretions of dust and dirt from various and sundry sources are gotten, and finally landed at the consumer's house, where at last it is zealously guarded from all further contamination.

It may be said that all such products should be washed, and a large percentage of them no doubt is, but it is safe to assume that a good deal of the fruit is swallowed, dust, soot, real estate and all, by the children and other members of the family. Is not this a promising field for the pure food champion and for the bacteriologist?

PRUNING AND THINNING.

Great advances have been made in recent years in the application of pruning to the regulation of fruit production and attaining the highest quality of fruit.

The ends to be attained are, form of tree (keeping it symmetrical and within proper height and size), removing useless wood, limiting production for a single year and making the trees bear every year, opening up the tree to air and sunlight to the end that plant diseases may not flourish and that the fruit may receive the necessary sunlight to give height and uniformity of color.

Thinning has received a good deal of attention of late years and has become a common practice among peach growers. The purpose of thinning is to remove all excess of fruit which the tree can not mature, and all diseased or imperfect fruit. The result is greater size, more uniformity, and better quality in the fruit grown. It prevents over-production and the consequent partial or total failure of the succeeding year's crop. It may be interesting to note a few of the principles involved. Over-production weakens the tree and prevents formation of strong fruit buds for the following year. The production of the seed causes the greatest drain on vitality of tree and plant food, and small fruits take about as much for their seed as the larger. There is more substance and less total air space in basket or barrels of small fruit than in the same measure of large fruit, yet we get more for the large fruit. We sell more air, in other words, and that has not yet been cornered. It costs less to pick fruit in midsummer and let it drop on the ground than to pick it carefully in baskets in the fall and finally sort it out. If these wormy and diseased fruits are raked up and fed to cattle or destroyed, it will be one of the best remedies against many insects and plant diseases.

APPLE GROWING.

Of all the larger fruit, our State is perhaps peculiarly adapted to the raising of apples. It has been asserted that nowhere in the country will certain varieties of apples attain such perfection as on some of the rocky hillsides of Rhode Island. The converse of this statement is at least true—that some of our hillsides are better adapted to apple raising than to any other industry.

There probably never was a more favorable time than the near future for the progressive apple grower. The people are becoming educated to the use of fruit as a part of their daily diet. Apple eaters increase in numbers every year, and each individual consumer in our country demands larger quantities than ever before. The force of the saying, "an apple a day, no doctor to pay," is growing on the people, and not only in our country, but in foreign countries as well, the demand seems to increase. Recent shipments of American apples abroad have netted good results and the exportation is on the increase. The coast States of New England and the Middle Atlantic States are peculiarly well situated to quickly supply this demand.

The principles given have been applicable to all kinds of fruit. A few notes devoted to apple growing especially may not be amiss.

One of the first questions that confront one is: Shall clean cultural methods be used, or shall the orchard be seeded down to grass?

A great avalanche of arguments in favor of the application of one or the other of these methods has been let loose. As in most cases where two opposing theories are clashing, a practice somewhere between the two extremes is probably the best. Where cultivation is possible, clean culture is undoubtedly advantageous, with perhaps a seeding down for one or two years at intervals of five to six years. If one can apply stable manure or raise a cover crop every year, the seeding down is unnecessary. Clean culture does not necessarily mean letting the land lay idle from the time the orchard is planted. During the early years it may be planted to some suitable crop. Of these, potatoes is perhaps the best; root crops, peas, beans, strawberries, and even currants and gooseberries can be used to occupy the ground until the trees come into bearing.

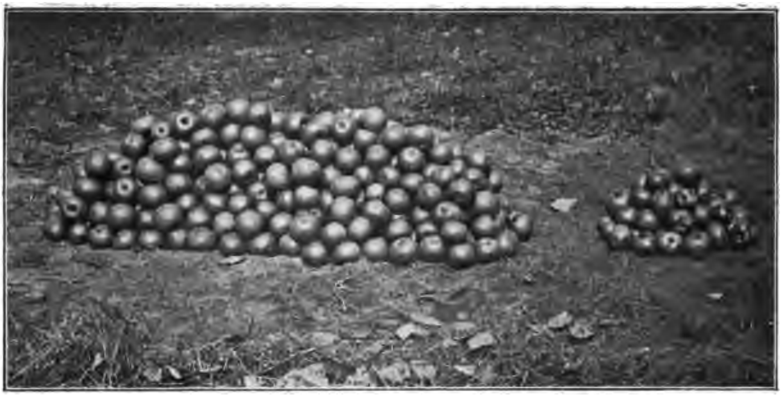
Sod culture is advocated by many successful growers. There is no doubt that on a great deal of our Rhode Island land where rocks are exceedingly abundant it is the only method practicable, financially, for most people. Sod culture in the sense that it is used by those who employ it successfully does not mean that both apples and hay or pasturage can be expected from the land without a suitable return of plant food in chemical fertilizers or stable manure. Those who have the best success cut the hay, but leave it on the ground as mulch and add fertilizers just as they would for any other crop. The advantages of this method are its adaptability to hilly and rocky ground, and cheapness. Its drawbacks are less vigor and productiveness of trees, more favorable conditions for plant diseases and insects. Thorough cultivation by the other method unlocks plant food and conserves moisture. These advantages are lost in sod culture.

Clean culture, after the trees have come into bearing, usually means clean cultivation during the spring and early summer, with seeding down to a cover crop during the first part of August. Crimson, mammoth, and red clover, vetches, oats, rye, and even rape, may be used for this purpose. The cover crop serves to hold the soil during the winter and furnishes humus when plowed under or disked in in the spring.

The distance at which trees should be set will vary with the variety. The tendency has been to plant at least the long-lived standard varieties too close together. The practice considered the best to-day is to plant permanent trees 36 or, better, 40 feet apart, and to set peaches or early bearing shorter-lived apple trees in between, making the trees at first stand 18 to 20 feet apart. When the trees begin to crowd, these temporary ones are cut out. In this way the orchard will begin to give returns earlier and produce more per acre than by the old method. On account of the severe winters of the last two or three years, people are more or less afraid of planting peaches, although if two or three good crops are secured from the trees it will pay well for the expense of planting and care. Where an orchardist does not care to risk planting peaches for temporary trees, the Wealthy apple makes a very excellent substitute. This is a hardy, early bearing tree; the fruit is of excellent quality, of fine color, and in good demand in the market.

Too much attention can not be given to the quality of the trees purchased. It is not enough that they should be true to name. Pedigree and bearing is as important in plants as in animals. Two cows may be of pure Jersey blood; one may give the owner a good profit, while the other may not pay for her board. So it often is with fruit trees. Experience has demonstrated that there is a great deal of difference in individual trees in a variety. Scions taken from one tree will produce trees which are two or three years tardy in coming into bearing, shy bearers, producing fruit of comparatively poor quality. Only the best trees should therefore be purchased, and of nurserymen who are up-to-date in their horticultural methods. Or, better still, at the present time, let the orchardist propagate his own stock from the best trees of which he knows.

For the main crop plant only a very few varieties. Select those which are well known and which have been found to be hardy. In marketing much depends on the reputation of the variety. At present a red apple is demanded by the market; color is of relatively more importance than quality. It is difficult to sell new varieties



Not wormy. Wormy.

Results of proper spraying for Codling Moth. Before treatment.

Thrifty, but in need of pruning.

unless of exceptional merit, and then even it will take time before there will be a general demand. Commission men recognize this, and usually label unknown red apples as Baldwins or some other well-known name, and light colored ones as Greenings or Pippins. A short time ago the writer saw a barrel labelled King which contained at least three or four other varieties. The Baldwin is perhaps the most popular and, if of good strain, is as desirable as any for a main crop apple in New England to-day. The Sutton is looked upon by many as a close second, if not an equal, of the Baldwin. It is not so well-known, however, and would be more difficult to sell. A few trees of other varieties may be planted for home use or special markets: Northern Spy, R. I. Greening, Roxbury Russet, McIntosh, Hubbardston; and among the sweet apples, Bentley Bailey Sweet, Tolman Sweet. The Black Gilliflower, which may be included here, although in disrepute, is a good apple, at least for cooking purposes, and quite desirable on account of its productiveness and resistance to insect pests and fungous diseases.

The McIntosh is inclined to sun scald and should therefore be top grafted on Northern Spy. In fact it is recommended by some growers that most of our apples should be top budded or grafted on the Spy on account of the strong vigorous growth and hardy body of this variety. The trees should be headed low. The first limbs should be not over two or three feet from the ground. Low trees are more easily sprayed and pruned, and picking is made much more economical. Modern orchard cultivators are so made that they will work the ground for several feet on one side or the other of the horses, and low limbs are no longer an obstacle to good cultivation.

PRUNING AND SPRAYING.

Pruning is nearly as essential to successful apple growing as to other lines of fruit. The principles already outlined for fruits in general are applicable here. It would be very difficult to try to give detailed directions for the work and it would take more space than can be given here. Common sense must be the main guide. Let the orchardist fix definitely in his mind what he wants to prune for, then let him use "horse" sense and go ahead.

The experience of nearly all successful fruit growers at the present time has demonstrated that spraying is essential to success. Now and then we find one who claims that spraying is useless, and that he gets just as good fruit without it. The probabilities are either that his conditions are peculiar or else that he errs in his judgment.

Spraying, however, is not the only means of fighting insects and plant diseases. Many cannot be reached by any method to which the term can be applied. What we may call sanitary or preventive methods should nearly always come first, and indeed in some cases they are the only methods which can be applied. Clean culture and destroying diseased or wormy fruit, already spoken of, come under this head. Clearing up rubbish and destroying various trees which act as hosts or breeding ground for fruit-tree enemies around the orchard is important. The wild cherry which harbors black knot, detrimental to plum and cherry, and apple tree tent caterpillars, the red cedar which propagates the apple rust, the wild thorn, from which the apple maggot originally came, and volunteer apple trees which support all kinds of apple foes, are examples of undesirable trees in the neighborhood of orchards. Encouraging and protecting insectiveorous birds is along the same line. Chickens pick up a number of insects which live part of their life cycle in the ground, and hogs, especially young ones, are also useful in diminishing the numbers of such insects.

The following are the principal insects which have been injurious to apple culture in our State the last two years: Apple tree borers (two kinds), wooly aphis, apple leaf aphis, San Jose scale, oyster-shell bark-louse, and scurfy bark-louse, tent caterpillar, codling moth, curculio, and apple maggot. Of these, the San Jose scale, codling moth, and apple maggot or railroad worm, have been the most destructive. The San Jose scale is the most formidable insect enemy that we have had to deal with, and will be considered more fully later on. The codling moth has been troublesome for a great many years, but is not feared so much now as it formerly was. Careful study of its life history has led to the discovery of how to limit its injuries to the minimum. The first brood of caterpillars nearly always enters at the calyx or blossom end of the apple shortly after the petals have fallen. Thorough spraying with lead arsenate, or Paris green, using a nozzle which throws a fairly coarse spray, and directing the spray upwards so that it will fall into the upturned calyx cups, is highly efficient. Note Fig. 1 (b). Later broods will be less numerous and are less likely to enter at any particular spot on surface of the apple and can be caught by ordinary spraying. The codling moth is exposed to the attacks of woodpeckers and other birds in the winter time and this also serves to keep them in check. The apple maggot is a much more formidable enemy. As has already been noted, it is an insect with a newly developed habit and very much on the increase. The adult insect is a rather active fly about the size of a house fly. The eggs are laid under the skin of the apple, and on hatching the maggot does not feed at the surface where it can be reached by either a poison or contact insecticide. When full grown the maggot enters the ground to pupate and remains there until the following summer. As has been intimated, this is the only point in its life history at which it can be attacked, and it is here that the use of chickens and hogs comes in. Care should be taken not to leave apples lying around the orchard after they have fallen from the tree.

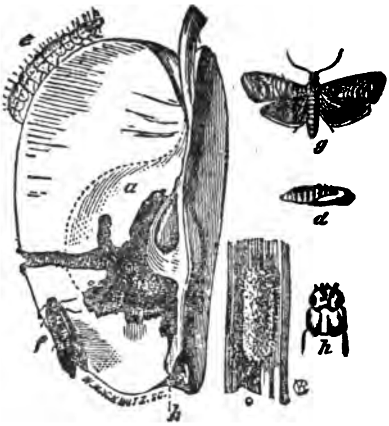


Fig. 1.

This insect used to confine its attacks to early apples, notably the Porter, but it is fast learning to like even our late winter apples such as the Baldwin and Russets.

The tent caterpillar is sometimes troublesome in neglected orchards, but as it can be attacked in almost every stage of its life history it is easily kept in check. The eggs can be collected in winter, the tents can be burned in the summer, and the caterpillar is easily destroyed by poison sprays.

The oyster-shell and scurfy bark-lice are quite prevalent, but they are native insects and have a great many natural enemies which serve to keep them in check. It is only now and then that they become destructive. If too plentiful, they can be destroyed with kerosene emulsion or even a solution of whale oil soap applied in early summer when the eggs begin to hatch.

The apple-leaf aphis is sometimes quite injurious to young trees and nursery stock and more seldom to larger trees. It can be kept in check by the timely use of kerosene emulsion.

The wooly aphis is more difficult to deal with, as it lives part of its life cycle underground on the roots of trees. It is not as yet generally distributed throughout the State, and those who plant new trees should guard carefully against its introduction. Close attention and destruction of the lice when they appear on the stem and twigs will help keep the insect in check, if not destroy it. The underground lice may be treated by punching holes in the soil about the roots and pouring in each hole a small quantity of carbon bisulphide and immediately closing the hole with damp earth.

There are two kinds of borers which may be troublesome: the flat-headed and the round-headed. They are quite different in form and habit, but as the remedies are practically the same it is not necessary to discuss the difference in their life histories. In both species the eggs are laid on the bark, and one of the combative methods consists in coating or protecting the tree in some way to prevent the depositing of the egg. Some recommend coating of soft-soap and a strong solution of washing-soda made into a thick paint; another paint is made of skim milk and cement. The same end may be more or less successfully attained by placing pieces of hard soap in the branches where they join the trunk. The rains will dissolve the soap and carry it down the stem. A wrapper of burlap or even building paper may be used to protect the trunk.

After the borer gets into the tree, he may sometimes be followed with a flexible wire and destroyed, but often the only way is to dig him out with a jack-knife.

SAN JOSE SCALE.

The following notes on the San Jose scale, with the exception of those on Limoid, are taken from Bul. 100 of the Rhode Island Experimental Station.

"This scale is found frequently throughout the State, and as it is one of our most serious insect pests and not generally known, a few notes in regard to it may be desirable.

"It was first discovered in the San Jose Valley, California, where it had become a serious pest in 1873. In the East it was first noted in 1893, where it is thought to have been introduced in 1886 or 1887, on plum trees purchased in California by two New Jersey nursery firms. From these nurseries it was distributed through several sections of the East before its presence was known.

"The San Jose scale occurs on all parts of a plant, and can live on nearly all deciduous trees, though it seems to have a preference for species of the rose family. When plentiful it gives a gray ashy coating to the limbs, but when not very numerous it is difficult to discover. On young wood and fruit it causes a peculiar reddening of the surrounding tissues. The insect lives over winter under protection of the scale. In May the males emerge, and by June the females begin to give birth to a new generation, and may continue to produce young for five or six weeks before they die. The young are hatched inside the body of the insect, instead of developing from eggs outside. The young larva is yellow in color. It crawls about for a short time and then inserts its long beak into the bark and proceeds to cover itself with the waxy scale protection, This process of moving and settling down takes two or three days. The males mature in two or three weeks, and emerge as two-winged fly-like insects. The females mature in about thirty days, and in from three to ten days more begin to produce young. The number of generations is determined by the female. There are probably three or four in this latitude. The scale is enormously prolific. Bulletin 3, Division of Entomology, U. S. Dept. of Agriculture, Washington, D. C., gives as a conservative estimate that the descendants of one female in one season may reach the enormous number of 3,216,080,400. Of itself the insect spreads very slowly, as the larva crawls only a few inches from its place of birth. Its principal means of distribution is through transportation of affected plants or parts of plants, and by birds and insects.

"REMEDY.

"Experiments have now shown that a well-prepared solution of lime, sulfur, and salt is a safe, effective, and reasonably cheap remedy against the San Jose and other scale insects. There are a great many questions in regard to the strength of the solution and methods of preparation which are not yet settled. Experiments have been carried on to determine if the boilding of the mixture, which is rather disagreeable and tedious, can not be done away with by special methods of preparation, or by the use of caustic potash or caustic soda. The results have in many cases been satisfactory, but the methods are not yet developed sufficiently to be fully recommended. The following formula of standard lime, sulfur, salt solution or lime-sulfur wash, as we shall term it, has been chosen from Bulletin No. 141 of the Virginia Experiment Station.

"Fresh lime (unslaked)	15 pounds.
"Sulfur (flowers)	15 pounds.
"Salt (a cheap grade)	5–10 pounds.
"Water	50 gallons.

"Slake the lime in four or five gallons of hot water, using an iron kettle of twenty to twenty-five gallons capacity. When the slaking is in full process sift in the sulfur gradually, meanwhile stirring the mixture thoroughly. Mix well, and add sufficient water to make a thick paste. Add the salt and six or eight gallons of hot water, and boil for forty or fifty minutes. Pour through a strainer made of tin or brass wire, sixteen to twenty meshes to the inch, add water to make fifty gallons, and the mixture is ready for use.

"Larger quantities can be made in the same proportions, using larger kettles. Two kettles should be at hand, one for heating the water and one for boiling the mixture. If steam can be obtained from a boiler, barrels or large wooden tanks can be used for this heating and boiling instead of the kettles.

"A large number of experiments have been carried on to find some method by which this tedious boiling can be done away with. Caustic soda has been used by the New York Experiment Station and others with good results. The formula already given can be used, but instead of adding salt to the lime-sulfur paste add gradually four to six pounds of caustic soda. Add hot water, if necessary, to make the solution of the consistency of a thin paste and stir thoroughly. As soon as the chemical action ceases add enough hot water to make fifty gallons. Either of the above mixtures should be of a dark-reddish-brown color if well prepared.

"Copper sulfate has been used at the rate of two and one-half pounds to the fifty gallons, instead of the salt, added either in crystals just before boiling or dissolved in the solution used for making up the fifty gallons of mixture. Some claim this to be advantageous; others say it is a useless waste of time and sulfate. Until further experiments have proved the newer combinations efficient it is advisable to use the plain boiled mixture, or, if boiling is very inconvenient, the preparation with caustic soda.

"The lime-sulfur washes are quite caustic, and some kind of protection must be given to the hands, face, and clothes of the sprayer and to the harness and horse.

"The Connecticut Experiment Station recommends a simple solution which, while expensive, may be used where only a small quantity is required. It consists of the following ingredients:

"Sulfid of potash	10 pounds.
"Lime	10 pounds.
"Water	20 gallons.

"Dissolve the sulfid of potash in two or three gallons of warm water and slake the lime with this solution. Mix thoroughly, and add water to make twenty gallons.

"A combination of lime and sulfur is prepared under the trade name of 'calcothian.' It is mentioned by the New Jersey Agricultural Station as more expensive than the home-made spray but quite as effectvie. For smaller trees, which can be closely covered with a tent of some kind, the use of hydrocyanic acid gas is the most efficient remedy. This is exceedingly dangerous, however, and should not be used except by persons who are well acquainted with this method of fumigation.

"Trees that are thoroughly infested with the scale to such an extent that the vitality is very low can often be saved by pruning back heavily. In such a case it may be easier and more efficient to apply the lime-sulfur wash with a whitewash brush instead of by means of a spray-pump.

"In the case of larger trees the trunk and branches may be coated with the lime-sulfur wash in the summer time by means of a brush, the further treatment being reserved until the following winter or spring. Care must be used, as far as possible, not to let the solution come in contact with the leaves, because of its very strong caustic properties.

"Claims have been adavnced that the lime-sulfur wash is a panacea for fungous diseases as well as for insects. It has been found to be beneficial against leaf-curl in the peach, but further than this a fungicidal property can not as yet be ascribed to it."

LIMOID–KEROSENE MIXTURE.

During the last year the Delaware Experiment Station has brought out a new remedy against the San Jose scale. This consists in mixing "Limoid," a carefully hydrated magnesian lime, and kerosene. It takes about four pounds of the "Limoid" to take up one gallon of kerosene. The mixture so produced can be diluted with cold water and it is ready for application.

The following formula is recommended:

Kerosene	1 gallon.
Limoid	4 pounds.

For a twenty per cent. solution, add this mixture to four gallons water. For a ten per cent. mixture, use nine gallons of water. Other percentages can be made up in a like manner. Larger lots can be made, using similar proportions. Pour the required quantity of "Limoid" into the kerosene gradually, meanwhile stirring thoroughly. If any oil remains unabsorbed, sprinkle in a little more "Limoid" until all is taken up. Then add the amount of water desired, stirring as before. The mixture may be stirred by pumping it through the pump the same as kerosene emulsion. Bordeaux mixture may be substituted for the water if so desired. Paris green may be added to the Bordeaux mixture before adding it to the kerosene "Limoid" mixture. A solution of rosin soap may be added to the single or the combined mixture.

The twenty per cent. mixture given above is a winter, spray to be used against the scale insects. The 10 per cent. solution may be used in the summer time against scale and other sucking insects.

SEVENTEENTH ANNUAL REPORT

OF THE

Corporation, Board of Managers

OF THE

Rhode Island College of Agriculture and Mechanic Arts,

MADE TO THE

General Assembly at its January Session, 1905.

Part I.

Part II—Experiment Station Report—is printed under separate cover.
Part III—Catalogue—is printed under separate cover.

Providence, R. I.
E. L. Freeman & Sons, Printers to the State,
1905.

Rhode Island College of Agriculture and Mechanic Arts.

Corporation.

Hon. MELVILLE BULL	Newport County.
Hon. C. H. COGGESHALL	Bristol County.
Hon. CHARLES DEAN KIMBALL	Providence County.
Hon. THOMAS G. MATHEWSON	Kent County.
Hon. J. V. B. WATSON	Washington County.

Officers of the Corporation.

Hon. CHAS. DEAN KIMBALL, President	P. O., Providence, R. I.
Hon. C. H. COGGESHALL, Clerk	P. O., Bristol, R. I.
Hon. MELVILLE BULL, Treasurer	P. O., Newport, R. I.

REPORT.

To His Excellency George H. Utter, Governor, and the Honorable General Assembly of the State of Rhode Island and Providence Plantations, at its January Session, 1905:

I have the honor to submit herewith the Seventeenth Annual Report of the Board of Managers of the Rhode Island College of Agriculture and Mechanic Arts, as required by law.

CHARLES DEAN KIMBALL,

President of the Board of Managers of the Rhode Island College of Agriculture and Mechanic Arts.

In order to place before your Excellency and the Honorable General Assembly the present condition of affairs at the college and to transmit such recommendations as have been made by your Board and by the president of the college, we include as Part I of this report the following: A statement of appropriations to be asked of the General Assembly—this statement embodying resolution of the Board of Managers; the annual report of the treasurer of the Board; and the report of the president of the college for the year. Part II will contain the usual report of the experiment station. Part III will be a statement of the courses of study and other details.

STATEMENT OF APPROPRIATIONS TO BE ASKED OF THE GENERAL ASSEMBLY BY RESOLUTION OF THE BOARD OF MANAGERS OF THE RHODE ISLAND COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

For current expense bills remaining unpaid January 1, 1905	$5,000 00
For student labor and agricultural demonstration	4,000 00
For repairs of poultry yards and buildings, experiment station	500 00
For general repairs and minor equipment, college	2,000 00
For greenhouse and attached building for teaching	15,000 00
For buildings and equipment for poultry teaching	5,000 00

CHARLES DEAN KIMBALL,
C. H. COGGESHALL,
J. V. B. WATSON,
THOS. G. MATHEWSON,
MELVILLE BULL.

TREASURER'S REPORT.

Melville Bull, *Treasurer, in account with the* Rhode Island College of Agriculture and Mechanic Arts.

1904.	Dr.	
Jan. 1.	To cash balance on hand	$1 74
	Receipts from president of college for students' board, etc.	18,175 83
	Interest	42 41
		$18,219 98

1904.	Cr.
By salaries	$474 98
Postage and stationery	273 90
Freight and express	493 87
Traveling	201 53
Labor	5,900 75
Store	1,748 61
Construction and repairs	1,382 68
Provisions	2,715 40
Boarding expense	1,022 40
Grain	580 31
Gasoline	76 52
Fertilizer	120 60
Coal	1,136 70
Printing	302 60
Telephone	51 60
Advertising	72 50
Incidentals	1,598 99
Balance on hand	66 04
	$18,219 98

This is to certify that we, the undersigned, auditing committee of the Board of Managers of the Rhode Island College of Agriculture and Mechanic Arts, have examined the account of Melville Bull, treasurer, as above, and find the same to be correct, leaving a balance in the hands of said treasurer of sixty-six dollars and four cents ($66.04).

THOMAS G. MATHEWSON,
J. V. B. WATSON,
Auditors.

MELVILLE BULL, *Treasurer, in account with the* UNITED STATES FUND OF 1862.

1904.	DR.	
Jan. 1.	To balance from last year	$2,884 48
	Interest received from state treasurer	2,500 00
		$5,384 48

1904.	CR.
By instruction	$2,070 02
Apparatus	226 79
Text-books and reference books	620 65
Stock and material	219 13
Balance on hand	2,247 89
	$5,384 48

This is to certify that we, the undersigned, auditing committee of the Board of Managers of the Rhode Island College of Agriculture and Mechanic Arts, have examined the accounts of Melville Bull, treasurer, of the United States Fund of 1862, and find the same correct.

The total receipts were $5,384.48, and the total expenditures were $3,136.59, thus leaving a balance of $2,247.89 to new account.

THOMAS G. MATHEWSON,
J. V. B. WATSON,
Auditors.

THE RHODE ISLAND STATE AGRICULTURAL EXPERIMENT STATION, *in account with the* UNITED STATES APPROPRIATION.

1904.	DR.
To receipts from the treasurer of the United States as per appropriation for fiscal year ended June 30, 1904, as per act of Congress, approved March 2, 1887	$15,000 00

1904.	CR.
By salaries	$8,758 84
Labor	1,561 54
Postage and stationery	283 52
Freight and express	115 49
Publications	71 65
Heat, light, and water	658 94
Chemical supplies	83 72
Seeds, plants, and sundry supplies	336 42
Fertilizers	243 14
Feeding-stuffs	563 70
Library	605 04
Tools, implements, and machinery,	699 37
Furniture and fixtures	33 02
Scientific apparatus	44 14
Live stock	28 35
Traveling expenses	174 69
Contingent expenses	15 00
Building and repairs	723 43
	$15,000 00

We, the undersigned, duly appointed auditors of the corporation, do hereby certify that we have examined the books and accounts of the Rhode Island State Agricultural Experiment Station for the fiscal year ended June 30, 1904; that we have found the same well kept and classified as above, and that the receipts for the year from the treasurer of the United States are shown to have been $15,000.00, and the corresponding disbursements $15,000.00, for all of which proper vouchers are on file and have been examined by us and found correct, thus leaving no balance.

And we further certify that the expenditures have been solely for the purposes set forth in the act of Congress approved March 2, 1887.

CHARLES DEAN KIMBALL,
C. H. COGGESHALL,
Auditors.

MELVILLE BULL, *Treasurer, in account with the* RHODE ISLAND STATE AGRICULTURAL EXPERIMENT STATION.

1904.	DR.
To balance from last year	$2,157 72
Station receipts	534 53
Interest	98 75
	$2,791 00

1904.	CR.
By publications	$11 15
Traveling	80 57
Contingent expenses	2 88
Postage and stationery	31 35
Seeds, plants, and sundry supplies	12 69
Building and repairs	41 05
Balance on hand	2,611 31
	$2,791 00

This is to certify that we, the undersigned, auditing committee of the Board of Managers of the Rhode Island College of Agriculture and Mechanic Arts, have examined the accounts of Melville Bull, treasurer, of the Rhode Island State Agricultural Experiment Station, and find the same correct.

The total receipts were $2,791.00, and the total expenditures were $179.69, thus leaving a balance of $2,611.31 to new account.

CHARLES DEAN KIMBALL,
C. H. COGGESHALL,
Auditors.

Synopsis of the Report of the Treasurer of the Rhode Island College of Agriculture and Mechanic Arts to the Secretary of Agriculture and the Secretary of the Interior, of amount received under Act of Congress, of August 30, 1890, *in aid of Colleges of Agriculture and the Mechanic Arts, and of the disbursements thereof, to and including June* 30, 1904.

Balance on hand July 1, 1903	
Installment for 1903–4	$25,000 00
	$25,000 00

DISBURSEMENTS THEREOF FOR AND DURING THE YEAR ENDING JUNE 30, 1904.

SCHEDULE A.—Disbursements for Instruction in Agriculture and for facilities for such instruction	$3,803 77
SCHEDULE B.—Disbursements for Instruction in the Mechanic Arts and for facilities for such instruction	7,411 98
SCHEDULE C.—Disbursements for Instruction in the English Language and for facilities for such instruction	2,202 71
SCHEDULE D.—Disbursements for Instruction in Mathematical Science and for facilities for such instruction	1,716 86
SCHEDULE E.—Disbursements for Instruction in Natural Science and for facilities for such instruction	6,764 68
SCHEDULE F.—Disbursements for Instruction in Economic Science and for facilities for such instruction	3,100 00
Total expenditure for the year	$25,000 00

I hereby certify that the above account is correct and true, and, together with the schedules hereunto attached, truly represents the details of expenditures for the period and by the institution named; and that said expenditures were applied only to instruction in agriculture, the mechanic arts, the English language, and the various branches of mathematical, physical, natural, and economic science, with special reference to their application in the industries of life, and to the facilities for such instruction.

MELVILLE BULL,

Treasurer.

This is to certify that we, the undersigned, auditing committee of the Board of Managers of the Rhode Island College of Agriculture and Mechanic Arts, have examined the above accounts of Melville Bull, treasurer, with the accompanying vouchers, and have found the same to be correct.

CHARLES DEAN KIMBALL,
C. H. COGGESHALL,
Auditors.

REPORT OF THE PRESIDENT OF THE COLLEGE.

To the Honorable Board of Managers of the Rhode Island College of Agriculture and Mechanic Arts:

GENTLEMEN:—I submit herewith the following report of our college work for the year ending December 31, 1904.

The year has been one of general prosperity. There has been no instance of contagious disease among the college population, and very few cases of illness of any kind. The attendance for the college year ended June, 1904, was as follows:

College	48
Preparatory school	67
Specials	5
Farm-practice, 4; poultry keeping, 21	25
Total (none counted twice)	142

This is an increase of 35 over the previous college year, and represents the largest attendance in the history of the college. For the fall term just closed I am able to report an attendance of 131, or an increase of 19 over the same term last year. The present enrollment is divided as follows:

College	57
General preparatory course	59
Industrial high school	5
Agricultural high school	1
Specials	3
Special winter course—Farm practice	6
Total	131

To this will be added for the college year the students in poultry-keeping and farm-mechanics, both courses beginning after the holidays.

This increase in attendance represents, I believe, a normal and healthy growth. No attempt has been made to "boom" the attendance. Indeed, this last term, candidates for admission were scrutinized with unusual care, but for which fact our entering classes would undoubtedly have been considerably larger. One of the interesting phases of the increase is the growth in the number of boarding students. The college serves a useful purpose in southern Rhode Island in ministering to the needs of the local population, which shows its interest by contributing a goodly proportion of the attendance of the college; two years ago, the majority of the students of the college were day-students. The boarding students mainly represent the attendance from any considerable distance, and consequently the usefulness of the college to other portions of the state. The following table illustrates the change that has taken place in this respect:

	1903. Spring term.	1903. Fall term.	1904. Fall term.
Day students	45	57	43
Boarding students	30	51	82

During the past term the average attendance at the dining-hall was 94. It has been necessary to set two tables as the dining-room accommodates only 60 at one time. A year ago last spring there were 35 cadets in military drill; last year there were 65, and this fall 90 are enrolled. Two years ago there were only two students regularly enrolled for agriculture; last year there were 6 such students, and this fall there were 10.

I have given these facts merely to indicate the extent and direction of the growth of the college. We hope to secure an even larger proportion of students from the central and northern parts of the state and also a steady increase in the number of students who come primarily for the study of agriculture.

CHANGES IN THE FACULTY.

Miss Harriet L. Merrow was granted leave of absence for the college year of 1904–05, for purposes of advanced study, and a portion of the regular work in botany has been assumed by Professor John Barlow. Miss Elizabeth W. Kenyon was elected secretary of the faculty for the year in place of Miss Merrow. Major Lewis Balch, in June, accepted an appointment in the United States service in Panama, and relinquished his position as instructor in military science and tactics. Major Balch, during his year of service, gave a new impetus to military drill in the college, bringing out many new plans and enthusing the students for the work. For the current college year, the college has secured the services of Captain Maurice H. Cook, of Providence. Captain Cook has had previous experience in the drilling of cadets as well as in the army. He is carrying forward with zeal and success this important branch of our college work. Mr. A. E. Stene was elected, April first, superintendent of college extension. Mr. J. Weston Hutchins, who had accepted the position for a period of six months, returned to his home in Michigan. He succeeded in laying the foundations for this important branch of our college activities. At the end of the college year Mr. Walter A. Mitchell resigned as instructor in physics and electrical engineering, and Walter S. Rodman, a graduate of this college in the class of 1904, in the course in electrical engineering, was appointed to this position, with additional duties as instructor in mathematics.

CHANGES IN COURSES.

The only change of importance during the year has been to carry out the vote of the Board establishing a course in highway engineering. This course as outlined in the catalogue gives a thorough foundation in civil engineering and attempts to bring the student during the senior year into touch with the practical as well as the theoretical problems involved in the actual construction of highways, under diverse conditions. Several of our present students elected the course, and we have reason to think it has attracted considerable attention outside of the college. By resolution of your Board, negotiations were opened with the town council of the town of South Kingstown relative to a working agreement by which the college might utilize the road machinery of the town and, at the same time, be of some possible assistance to the town in its road work. The town council seemed very much interested in our proposition, and, while no contract was entered into, they subscribed to an agreement which is practically covered by the following letter to the present road commissioner of the town:

KINGSTON, RHODE ISLAND, March 15, 1904.

MR. P. O. LITTLEFIELD,
Wakefield, Rhode Island.

DEAR SIR:—In accordance with the suggestion of yesterday, I am transmitting the plan and agreement reached between the town council and yourself as road commissioner on the one hand and Dr. Hewes and myself as respecting the college on the other hand, relative to use of the town road machinery by the college and also for the work of our highway engineering students on the roads of the town.

1. It is understood that our professor of highway engineering and his students in that subject will be allowed to make observations, estimates, etc., of the roads and road work of the town. Also, that it will be permissible, after a proper arrangement with yourself, for the professor and his students to take charge of a short piece of road work in order that the student may secure first hand practice in road work; this work, of course, to be done satisfactorily to yourself, without expense to the college, and without extra cost to the town except so far as you may determine.

2. In case the college wishes to build roads on its own property, the town will loan to the college its road machinery, including crusher, roller, carts, sprinkler, etc., without rental; provided that the crusher will not be removed from its location, that the college will employ the town engineers for the crusher and the roller, will pay all expenses of running the machinery while in use on the college grounds, and will repair all damages incurred in such use.

3. It is understood that, in so far as our professor of highway engineering has time and opportunity, he will be glad to render any services to the town in respect to highway work that may be desired by yourself, and that may be consistent with his other duties.

4. It is understood that this is, in no sense, a contract, and that the arrangements may be terminated at any time by either party.

I desire to thank you most cordially for your interest in this matter, and, through you, to thank the town council for their attitude and for their willingness to be of assistance to us.

Very truly,
(Signed) KENYON L. BUTTERFIELD,
President.

MACADAM ROADS.

In connection with our highway-engineering course, I desire to call the attention of your Board to the great importance of building macadam road upon the college grounds. I wish to recommend most earnestly that the legislature be requested to make a small appropriation each year, say of five hundred dollars, which may be expended under the direction of the department of highway engineering in building or repairing macadam road on the college grounds, with the understanding that this work is to be done both with the view of making a first class and permanent road system and of meeting the needs of students who are taking the course in highway engineering. You will, I am sure, appreciate the fact that, if the course is to be made a complete success, the students must have the same facilities for laboratory practice and the same practical application of their theories as can be obtained in chemistry, mechanical engineering, or poultry keeping. A few hundred feet of road built each year would, in course of time, give us a system of beautiful and permanent roads, requiring small expenditure for repair, answering the needs of an increasing college population which has to depend upon the roads as sidewalks during all seasons, and offering an absolutely essential requisite to the students in highway engineering.

DEMONSTRATION AND EXTENSION WORK.

I again refer to this subject, covered at some length in my report of a year ago, because of its great importance. The college must more and more carry its work to the farmers, taking to them knowledge and inspiration along all lines of farm business and farm life. During the past autumn a series of extension lectures has been held in various portions of the state. Mr. J. Weston Hutchins, of Michigan, has been present at all of these, and Mr. A. E. Stene, our superintendent of extension work, at a number of them. Thirty-nine lectures were held, in 28 sessions, at 21 places, and it is estimated that between eight hundred and a thousand different farmers were reached. This was accomplished at a comparatively small expenditure of money on the part of the college. The list of dates and places follows:

November	14,	1904.	Arnold's Mills.
“	15,	“	Primrose Grange, Woonsocket.
“	16,	“	R. I. Horticultural Society, Providence.
“	17,	“	Harrisville.
“	18,	“	Greenville.
“	21,	“	Summit.
“	22,	“	Rocky Hill.
“	23,	“	Lime Rock.
“	25,	“	East Woonsocket.
“	28,	“	Exeter.
“	29,	“	Davisville.
“	30,	“	Woody Hill.
“	30,	“	Hope Valley.
December	1,	“	Wakefield.
“	3,	“	Point Judith.
“	5,	“	Bristol Ferry.
“	5,	“	Portsmouth.
“	6,	“	Middletown.
“	7,	“	Tiverton Four Corners.
“	8,	“	Perryville.
“	9,	“	Little Compton.

As spring approaches, Mr. Stene will spend a large portion of his time in giving demonstrations in spraying for insects and diseases that may trouble the orchards of the state. An attempt is also being made to interest the teachers of the state in various forms of nature study.

CHANGES IN FACULTY ORGANIZATION.

During the year the faculty has adopted revised by-laws. Under the new plan the faculty is divided into *the faculty proper*, consisting of all employees listed in the catalogue, including the experiment-station workers, and *the faculty council*, formerly the "jury," made up of administrative heads of departments of the college. The plan is based upon the idea that the general legislative and administrative work of the college can best be handled by a comparatively small body and that it should lie in the hands of those chiefly responsible, namely, the heads of departments. On the other hand, there are many questions of general policy which are of interest to all employees of the college. Under the plan adopted, the faculty will hold occasional meetings for discussion of subjects of general interest. It may pass such resolutions as it chooses, but these are merely expressions of opinion and do not bind the faculty council in any way. It is thought that this very simple device will relieve the faculty council of considerable work, will engender a new interest, on the part of all members of the faculty, in the larger college problems, and will give a better opportunity to those members of the faculty who are not heads of departments to acquaint themselves with the purposes and methods of the institution.

In connection with this new arrangement, the committee system of the faculty council has been elaborated to some extent. More details of administration are left with the committees, but the committee appointments are so made and the list of committees so formed that it is hoped that no member of the council will be seriously burdened with these duties.

During the past term a plan has been evolved for enabling the council to keep more closely in touch with students who are becoming delinquent in classwork. A system of bi-weekly reports is made to appropriate committees which take up each case on its merits and bring the matter to the attention of the student, or, if necessary, to the faculty council itself.

STUDENT COUNCIL.

About a year ago the students were invited to elect a council of seven members, composed of two from the senior class, two from the junior class, and one each from the sophomore class, the freshman class, the preparatory school. No definite plan of organization was suggested, but the council was invited to take up for discussion and action such questions as might be presented to it by the student body or by the faculty itself. It was thought that a committee of students of this kind, made up of responsible men and women, interesting itself in the various phases of college life, meeting, with greater or less frequency, individuals or committees of the faculty council, would eventually become an agency of great value to the student life. The council has adopted a constitution, appointed committees, and has already had before it a number of questions for decision and action. Thus far the plan has worked well, and we hope that it will justify expectations by becoming a wise and efficient medium of communication between the students and faculty and will assist in developing genuine college spirit.

VISITATION OF OTHER COLLEGES.

By consent of your Board, Professor Fred W. Card and myself visited last May all but one of the New England Colleges of Agriculture and Mechanic Arts. I think the general impression by this interesting and profitable trip was that all the New England institutions are very rapidly enlarging their facilities and increasing their attendance, and that they will soon rank among the most important educational agencies in New England. The situation with respect to agriculture in these institutions is especially gratifying. In nearly every case the attendance of agricultural students is on the increase, graduates of agricultural courses are being offered satisfactory positions as managers and superintendents of farms, and the attention of young men is being increasingly called to the opportunities, even in New England, for men who possess the requisite training in agriculture. The general lesson for our college which we gathered was perhaps the fact that the people of Rhode Island must not ask us "to make bricks without straw," for it was noticeable that in these colleges the increase in the number of agricultural students was paralleled and usually preceded by increase in agricultural buildings and equipment.

COMMENCEMENT.

We were favored this year with good weather, and the commencement exercises were carried on in a satisfactory manner. Mr. W. E. McClintock, president of the Massachusetts Highway Commission, delivered the address of the day, on the subject, "The Economics of Good Roads."

ACCOUNTING SYSTEM.

By direction of your Board, after January first, 1905, the books of the treasurer will be kept at the college. In this connection, and also by your approval, a new accounting and bookkeeping system will go into effect. To assist in outlining this system we have had the expert services of Mr. Fred C. Kenney, cashier of the Michigan Agricultural College. We believe that the new system will not only give a clearer, more complete, and more easily accessible statement of all financial transactions, but will also compel a closer division of the funds; and will permit, what is extremely important, a perfectly clear and definite statement to the public of comparative expenditures from year to year.

FINANCES OF THE COLLEGE.

Your Board has already voted to ask the legislature for five thousand dollars to pay current bills incurred prior to January 1, 1905. But inasmuch as one year ago I brought this matter to the attention of your Board, and as I have also definitely suggested the plan to you since that time, I desire to record my view of the situation with respect to this appropriation. The college has, at this date, unpaid bills amounting to not less than five thousand dollars. On the surface this appears to be a deficit, but I want to make it very clear that it is not, in reality, a deficit, but *a debt*. In other words, the current appropriation of $15,000.00 for the immediate present is nearly adequate for our needs. This deficit, sometimes as low as three thousand dollars and sometimes as high as six thousand dollars, has been, as I understand it, a recurring fact in the college finances for some six or seven years. I take it that each year it has been the thought of the administration that some economies could be practiced by which this deficit could finally be wiped out. I have given this matter my best attention, and, although I indulged the same hope a year ago, it seems to me very clear that with a growing college and consequent new demands, it will be impracticable to reduce the debt in this manner. I therefore earnestly hope that the legislature will see its way clear to make this appropriation, in order that we may be able to start the new year with a clear record. I wish to say further, in this connection, that while it may be possible to make reductions in expenditure at some points, I do not believe that it is feasible to lessen expenditures by any large amount except by some drastic measures which would almost surely seriously cripple, if not destroy, the usefulness of the institution.

NEEDS OF THE COLLEGE.

It ought clearly to be understood by the people of the state that, while the college has a considerable income from the United States Government, through the two Morrill acts, there are absolute limitations as to the use that may be made of this income, and that, moreover, the state, in accepting these grants, has definitely agreed to support the institution at those points where the Federal funds are not available. The state, for instance, must furnish the land, all buildings and repairs of the same, all expense of maintenance of the plant, such as labor, fuel, express, and freight. In general terms, the Federal funds may be used only for immediate means of instruction, such as salaries, books, and tools for instruction. The state must, therefore, expect continuing, and probably increasing, calls for expenditures, provided the college is to carry out its function and to do the work prescribed for it by the Federal acts which created it, the terms of which the state has accepted.

I may say, in passing, that one of the needs of the college which must be met at an early date is a new dormitory for men students. The present dormitory, accommodating comfortably forty-five, contains this year about fifty-five students. Some fifteen or sixteen men students are living in private houses in the village of Kingston. But such accommodations in the village are strictly limited, and we must either interest someone in building private lodging or boarding-houses, or we must soon have another dormitory. As conditions exist, it is probable that the latter course will be the necessary one.

The most pressing needs of the college, in my judgment, are a greenhouse and a poultry plant. As I understand it, the people of Rhode Island desire that this college shall emphasize more than it has done in the past the teaching of agriculture. I do not believe that they desire us to tear out the courses in mechanic arts or even the courses in science and to turn the institution into a college solely for agriculture. But even if this radical and, to my mind, exceedingly unwise step were taken, we still should have inadequate facilities for the teaching of agriculture, simply because, as I indicated above, the Federal funds, no matter how large, can not be used for buildings. It must be remembered, moreover, that this problem of teaching agriculture is a very difficult problem. It involves a relatively large equipment. Agriculture can not be taught merely from books. Proper facilities for laboratory work must be provided. In view of these facts, I can not too strongly state that our facilities for teaching agriculture are grossly inadequate. The reason for this fact hinges on what seems to us the evident wisdom of emphasizing such phases of agriculture as shall meet the needs of eastern farming. We must bend our energies to instruction in those lines that promise to dominate Rhode Island agriculture. Therefore horticulture, in its various phases, poultry keeping, and milk dairying are evidently lines of instruction which we must largely emphasize. I believe that this college is the only land-grant college in the Union which does not have a greenhouse; we ought to have one of the best in the country. While our poultry course has attracted attention all over the east, yet facilities for instruction, except for theoretical work, practically do not exist. Even the present short course seriously breaks into the work of experimentation, because we find it an absolute necessity to use certain portions of the equipment of the experiment station while the poultry students are taking their instruction work.

Let me say again that I believe that the need of a greenhouse and a poultry plant is the greatest need which exists at the college. If the people of the state really desire that agriculture shall be emphasized at this college, they must see to it that facilities for agricultural work are granted. We must decline to be responsible for building up the agricultural phases of our college work unless we are given the proper tools to work with. With such facilities we have full faith in the success of these lines of agriculture. Without this equipment we shall do all we can to attract agricultural students, but we can not hope to make any marked progress until these essential buildings are placed at our disposal.

All of which is respectfully submitted.

KENYON L. BUTTERFIELD,

President.

December 31, 1904.

SEVENTEENTH ANNUAL REPORT

OF THE

Corporation, Board of Managers

OF THE

Rhode Island College of Agriculture and Mechanic Arts,

MADE TO THE

General Assembly at its January Session, 1905.

PART III—CATALOGUE.

Part I—General Report for the Year—is printed under separate cover.
Part II—Experiment Station Report—is printed under separate cover.

Providence, R. I.
E. L. Freeman & Sons, Printers to the State,
1905.

Rhode Island College of Agriculture and Mechanic Arts.

Corporation.

Hon. MELVILLE BULL	Newport County.
Hon. C. H. COGGESHALL	Bristol County.
Hon. CHARLES DEAN KIMBALL	Providence County.
Hon. THOMAS G. MATHEWSON	Kent County.
Hon. J. V. B. WATSON	Washington County.

Officers of the Corporation.

Hon. CHAS. DEAN KIMBALL, President	P. O., Providence, R. I.
Hon. C. H. COGGESHALL, Clerk	P. O., Bristol, R. I.
Hon. MELVILLE BULL, Treasurer	P. O., Newport, R. I.

Report.

To His Excellency George H. Utter, Governor, and the Honorable General Assembly of the State of Rhode Island and Providence Plantations, at its January Session, 1905:

I have the honor to submit herewith Part Three of the Seventeenth Annual Report of the Board of Managers of the Rhode Island College of Agriculture and Mechanic Arts, as required by law.

CHARLES DEAN KIMBALL,

President of the Board of Managers of the Rhode Island College of Agriculture and Mechanic Arts.

Faculty and Other Officers.

KENYON LEECH BUTTERFIELD, A. M.,

PRESIDENT,

Professor of Political Economy and Rural Sociology,

B. S., Michigan Agricultural College, 1891; Assistant Secretary, Michigan Agricultural College, 1891–1892; Editor, Michigan "Grange Visitor," 1892–1896; Superintendent, Michigan Farmers' Institutes, 1895–1899; Field Agent, Michigan Agricultural College, 1896–1899; Graduate student, University of Michigan, 1900–1902; A. M., University of Michigan, 1902; Instructor in Rural Sociology, University of Michigan, 1902; Entered upon duties as President, April, 1 1903.

HOMER JAY WHEELER, PH. D.,

Professor of Geology and Agricultural Chemistry,

B. S., Massachusetts Agricultural College, 1883; Assistant Chemist, Massachusetts State Experiment Station, 1883–1887; Graduate student, University of Göttingen, 1887–1889; Ph. D., Göttingen, 1889; Appointed Chemist of Rhode Island Agricultural Experiment Station and Professor of Geology, 1890; Acting President, August 15, 1902–April 1, 1903.

E. JOSEPHINE WATSON, A. M.,

Professor of Languages,

A. B., Smith College, 1882; A. M., Cornell University, 1883; Assistant in English, Smith College, 1883–1887; Student of North European Languages in Göttingen, 1887–1889; Appointed Professor of Languages, September, 1892; Student of French in Tours, summer of 1895.

WILLIAM ELISHA DRAKE, B. S.,

Professor of Mechanical Engineering,

B. S., Polytechnic Institute, Worcester, 1886; Instructor in Physics and Electricity, Worcester Polytechnic Institute, 1887; Instructor in Woodworking at Pratt Institute, Brooklyn, 1887–1893; Appointed Professor of Mechanical Engineering, 1893.

HARRIET LATHROP MERROW, A. M.,*

Professor of Botany,

B. S., Wellesley College, 1886; Teacher of Science, Plymouth (Mass.) High School, 1887–1888; Teacher of Science, Harcourt Place, Gambier, O., 1888–1891; Graduate student, University of Michigan, 1891–1892; A. M., Wellesley College, 1893; Graduate assistant, Botanical Laboratory, University of Michigan, 1893–1894; Appointed Professor of Botany, January, 1895.

All salaries of members of the faculty are paid from United States funds.

*Absent for the year.

FRED WALLACE CARD, M. S.,

Professor of Agriculture,

B. S., Cornell University, 1892; M. S., Cornell University, 1893; Assistant Horticulturist, Cornell University Experiment Station, 1893; Associate Professor of Horticulture, University of Nebraska, 1893–1898; Appointed Professor of Horticulture, 1898.

COOPER CURTICE, D. V. S., M. D.,

Professor of Animal Industry,

B. S., Cornell University, 1881; D. V. S., Columbia Veterinary College, N. Y., 1883; M. D., Columbian University, Washington, D. C., 1887; Assistant Paleosoic Paleontologist, U. S. Geological Survey, 1883–1886; Specialist, Department of Agriculture, Washington, D. C., 1886–1892; Veterinarian, State Board of Health, N. Y., 1892–1894; Tuberculosis Specialist, U. S. Department of Agriculture, Washington, D. C., 1895–1896; Professor of Zoölogy, North Carolina College of Agriculture and Mechanic Arts, 1898; State Veterinarian, North Carolina, 1899; Appointed Professor of Zoölogy, 1900; Professor of Animal Industry, 1902.

LAURENCE ILSLEY HEWES, PH. D.,

Professor of Mathematics and Highway Engineering,

B. S., Dartmouth, 1898; With Engineering Department, Massachusetts Highway Commission, seasons of 1897–1899; Assistant Engineer, G. R. & I. Street Railway, Essex Co., Mass., 1899; Inspector of Macadam Road Construction, Brookline, Mass., 1900; Ph. D., Yale University, 1901; Appointed Professor of Mathematics, 1901.

VIRGIL LOUIS LEIGHTON, PH. D.,

Professor of Chemistry,

A. B., Tufts College, 1894; A. M., Kansas State University, 1895; Ph. D., Tufts College, 1897; Instructor in Organic Chemistry, Tufts College, 1897–1901; Appointed Associate Professor of Chemistry, 1901; Professor, 1903.

JOHN BARLOW, A. M.,

Professor of Zoölogy,

B. S., Middlebury, 1895; A. M., Brown University, 1896; Assistant Biologist, R. I. Experiment Station, 1898; Professor of Biology, Fairmount College, 1898–1901; Appointed Professor of Zoölogy, 1901.

GILBERT TOLMAN, A. M.,

Professor of Physics and Electrical Engineering,

B. M. E., University of Maine, 1896; Instructor in Physics and Physical Geography, Shaw University (Raleigh, N. C.), 1896–1900; A. M., Columbia University (New York City), 1901; Assistant Department of Physics, Columbia University, 1901–1903; Appointed Professor of Electrical Engineering, 1903.

THOMAS CARROLL RODMAN,

Instructor in Woodwork,

Appointed, 1890.

All salaries of members of the faculty are paid from United States funds.

MABEL DEWITT ELDRED, B. S.,

Instructor in Drawing,

B. S., R. I. College of Agriculture and Mechanic Arts, 1895; Appointed Instructor in Drawing, 1897.

MARSHALL HENRY TYLER, B. S.,

Instructor in Surveying and Master of the Preparatory School,

B. S., Amherst College, 1897; Instructor at St. Mark's, 1897–1898; Appointed Master of the Preparatory School, 1898.

ELIZABETH WATSON KENYON, A. M.,

Instructor in Languages and History,

B. S., Mt. Holyoke College, 1896; A. M., Brown University, 1897; Instructor in English and History, Middleborough (Mass.) High School, 1898–1900; Appointed Instructor in Languages and History, 1900.

HOWLAND BURDICK, B. S.,

Instructor in Agriculture and Farm Superintendent,

B. S., R. I. College of Agriculture and Mechanic Arts, 1895; Appointed Assistant in Agriculture, 1897; Appointed Instructor in Agriculture and Farm Superintendent, 1900.

F. PEARLE TILTON,

Instructor in Stenography and Typewriting.

JOSEPHINE OSBORNE BOSTWICK, A. B.,

Instructor in Languages,

A. B., Acadia College, 1901; Assistant in English Branches, Acadia Seminary (Wolfville, N. S.), 1902–1903; Appointed Instructor in Languages, 1903.

MAURICE HOWE COOK, PH. B.,

Instructor in Military Science and Tactics,

B. P., Brown University, 1897; Captain, 1st R. I. U. S. Vol. Inf., 1898–1899; Appointed Captain and Signal Officer, Brigade of R. I. Militia, 1902; Appointed Instructor in Military Science and Tactics, 1904.

WALTER SHELDON RODMAN, B. S.,

Instructor in Physics and Electrical Engineering,

B. S., R. I. College of Agriculture and Mechanic Arts, 1904; Appointed Instructor in Physic and Electrical Engineering, 1904.

MAURICE ADIN BLAKE, B. S.,

Instructor in Horticulture,

B. S., Massachusetts Agricultural College, 1904; Appointed Instructor in Horticulture, 1904.

All salaries of members of the faculty are paid from United States funds.

JOHN FRANKLIN KNOWLES, B. S.,

Assistant in Woodwork.

GEORGE BURLEIGH KNIGHT,

Assistant in Ironwork.

LILLIAN MABELLE GEORGE, B. S.,

Assistant in English and Librarian.

ANDREW HOWARD STENE, M. S.,

Superintendent of College Extension,

B. S., University of Minnesota, 1897; Principal of Schools, Ashby (Minn.), 1897–1901; M. S., Cornell University, 1902; Appointed Assistant in Horticulture, 1903, Appointed Superintendent of College Extension, April 1, 1904.

LUCY COMINS TUCKER,

Secretary to the President.

SARA LOUISA McCRILLIS,

Matron.

All salaries of members of the faculty are paid from United States funds.

Non-Resident Lecturers and Demonstrators in Short Courses in Agriculture, 1904–1905.

Farm-Practice Course, 1904.

John W. Clark, North Hadley, Mass., APPLE CULTURE.
Dr. H. W. Heaton, Olneyville, R. I., HOW THE FARM KEEPS SCHOOL FOR ME.
William A. Peckham, Little Compton, R. I., POTATO GROWING.

Poultry Course, 1905.

Dr. A. A. Brigham, Marlboro, Mass., PRINCIPLES OF BREEDING. Eight lectures.
I. K. Felch, Natick, Mass., STANDARD POULTRY, JUDGING POULTRY, AND JUDGING PRACTICUM. One week.
George K. Frank, Boston, Mass., PICKING AND DRESSING POULTRY. One demonstration.
A. F. Hunter, Roxbury, Mass., EGG PRODUCTION AND MARKETING FOWLS. Six lectures.
C. H. Jenks, Pawtucket, R. I., POULTRY EXPERIENCE. One lecture.
J. Alonzo Jocoy, Wakefield, R. I., BROILERS AND EGG PRODUCTION. Two lectures.
D. J. Lambert, Apponaug, R. I., HOW TO ESTABLISH A BUSINESS, BEST PART OF THE POULTRY BUSINESS, PLYMOUTH ROCKS.
J. F. Robinson, Farm Poultry Publishing Co., Boston, Mass., ADVERTISING. One lecture.
W. D. Rudd, Boston, Mass., THE POULTRY MARKET. One lecture.
Franklin L. Sewell, Quincy, Ill., TYPES OF FOWLS. Crayon illustrations. Two lectures.
E. C. Tefft, Wakefield, R. I., NATURAL BROODING AND REARING OF CHICKS, ASIATIC BREEDS. Six lectures.
Thomas Wright, South Sudbury, Mass., SQUAB RAISING. Three lectures.

CALENDAR.

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College Calendar.

1904.

Tuesday, September 13	Entrance Examinations at 9 A. M.
Wednesday, September 14	Fall term begins at 1 P. M.
Tuesday, November 8	Election Day.
Wednesday, November 23, 12 M. Tuesday, November 29, 8:30 A. M.	Thanksgiving Recess.
Wednesday, December 21	Fall Term ends at 12 M.

1905.

Tuesday, January 3	Winter Term begins at 1 P. M.
Thursday, January 26	Day of Prayer for Colleges.
Wednesday, February 22	Washington's Birthday.
Tuesday, March 28	Winter Term ends at 12 M.
Tuesday, April 4	Spring Term begins at 1 P. M.
Friday, May 12	Arbor Day
Tuesday, May 30	Memorial Day.
Sunday, June 11	Baccalaureate Address.
Tuesday, June 13	Commencement Exercises.
Friday, June 16	Entrance Examinations at 9 A. M.
Monday, September 11	Examinations for Entering and Conditioned Students at 1 P. M.
Tuesday, September 12	Examinations for Entering and Conditioned Students at 9 A. M.
Wednesday, September 13	Fall Term begins at 9 A. M.; Registration at 9:30 A. M.
Thursday, September 14	Classes as per Schedule.
Tuesday, November 7	Election Day.
Wednesday, November 23, 12 M. Tuesday, November 29, 8:30 A. M.	Thanksgiving Recess.
Wednesday, December 20	Fall Term ends at 4:15 P. M.

1906.

Tuesday, January 2	Examinations at 9 A. M.
Wednesday, January 3	Winter Term begins at 9 A. M.; Registration at 9:30 A. M.
Sunday, February 11	Day of Prayer for Colleges.
Thursday, February 22	Washington's Birthday.
Tuesday, March 27	Winter Term ends at 4:15 P. M.
Tuesday, April 3	Examinations at 9 A. M.
Wednesday, April 4	Spring Term begins at 9 A. M.; Registration at 9:30 A.M.
Friday, May 11	Arbor Day.
Wednesday, May 30	Memorial Day.
Sunday, June 10	Baccalaureate Address.
Tuesday, June 12	Commencement Exercises.
Friday, June 15	Entrance Examinations at 9 A. M.

Experiment-Station Council.

Kenyon L. Butterfield, A. M.	President of the College. *Ex-officio* Member.
H. J. Wheeler, Ph. D.	Director, Chemistry and Agronomy.
Fred W. Card, M. S.	Horticulture.
Cooper Curtice, D. V. S., M. D.	Animal Husbandry.
Burt L. Hartwell, Ph. D.	Associate, Chemistry.
George E. Adams, B. S.	Assistant, Agronomy.
M. A. Blake, B. S.	Assistant, Horticulture.
James W. Kellogg, B. S.	First Assistant, Chemistry.

Other Members of the Station Staff.

Matthew Steel, M. S.	Second Assistant, Chemistry.
Nathaniel Helme	Meteorologist.
Beulah A. Hoitt	Stenographer and Accountant.
Martha Vickery	Stenographer and Librarian.

The publications of the Station will be mailed free on request to anyone in Rhode Island interested in Agriculture. The Station desires the co-operation of the farmers of the state in the work of investigation, and any facts of special interest concerning animal or vegetable growth or disease are solicited. Visitors are always welcome. Railroad station, telegraph, express, and post-office—Kingston, Rhode Island. Long distance telephone, Narragansett Pier exchange.

The College.

History.

In 1863 the state of Rhode Island accepted from the United States Government the land grant script, which gave to each state thirty thousand acres of the public lands for each senator and representative in Congress. The land was to be sold by the states or their agents, the proceeds arising from the sale invested, and the annual income derived therefrom was to be "inviolably appropriated by each state which may take and claim the benefit of this act, to the endowment, support, and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to Agriculture and Mechanic Arts, in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."

On March 2, 1887, the act known as the Hatch Act was passed, appropriating $15,000 annually to each state, for the purpose of establishing an Agricultural Experiment Station in connection with an Agricultural College or School. Such an Agricultural School was provided for by Chapter 706 of the Public Laws, passed May 23, 1888.

The United States Congress, on August 30, 1890, passed an act known as the New Morrill Bill. This appropriated for the further support of the agricultural and mechanical colleges a sum beginning with $15,000 and continuing, with a yearly increase of $1,000, until the annual appropriation should reach $25,000.

That the school already established might receive the benefit of the act of Congress, the General Assembly amended Chapter 706 of the Public Laws, incorporating the Rhode Island College of Agriculture and Mechanic Arts.

Since September, 1892, the institution has been conducted on a college basis, with an entirely new course of study.

On April 19, 1894, the legislature passed an act authorizing the state treasurer to pay Brown University the sum of $40,000, in consideration of which the university was to turn over to the state the proceeds of the original land grant of 1862 and to withdraw from the United States Supreme Court its suit for the Morrill fund.

On January 27, 1895, the college dormitory was destroyed by fire; but it was replaced by a new granite building, which was ready for use the first of October of the same year, and was called Davis Hall.

At the January session of the legislature, 1897, the institution was given an appropriation for a stone building, one hundred and thirty feet by forty feet, practically three stories high. The basement has three rooms used for instruction in photography and physics, and a large room devoted to electrical engineering. On the second floor are recitation-rooms, chapel, library, and reading-room, and young women's study-room. The third floor contains a large hall for drill and gymnasium purposes, above which are bath-rooms and lockers. The hall is also used for assemblies whenever larger audiences are expected than the chapel can accommodate. This building is called Lippitt Hall.

In 1898 an excellent dairy barn was erected. This has given the agricultural department increased facilities for instruction.

On May 8, 1901, the Board of Managers established a school of mines, to be connected with the school of mechanical and electrical engineering. The courses of instruction for the Freshmen and Sophomore years of this school have already been arranged, and are identical with the courses given in the mechanical and electrical engineering school. The courses for the Junior and Senior years will be made ready for publication as soon as sufficient funds are at hand to put them into effect.

Object of the College.

The Rhode Island College of Agriculture and Mechanic Arts is an integral part of the school system of the state. Young men and young women from the high schools are admitted to the privileges of the institution without charge for tuition. The object of the college is to prepare young people to take active part in the agricultural, manufacturing, and commercial development of the state. To this end, technical instruction in the sciences and mechanic arts is the fundamental work of the institution. In order that specialization may not be premature, technical instruction in the various courses is accompanied by instruction in languages, history, political science, and mathematics.

There are seven courses leading to the degree of Bachelor of Science: agriculture, mechanical engineering, electrical engineering, highway engineering, chemistry, biology, and general science. Certain courses are chosen in the Freshman year, others in the Sophomore year; and at the beginning of the Junior year each student has selected the particular course in which he hopes to take a degree.

The aim of the agricultural course is to fit students not only for practical agriculture but for positions in experiment stations and as teachers. To this end, thorough instruction is given in science and the application of its principles to agriculture, supplemented by a general training in mathematics and languages. The mechanical course is intended for those wishing to become mechanical engineers, as the electrical course is designed to train electrical engineers. The course in highway engineering is designed to equip students as practical working highway engineers. The instruction given is essentially civil engineering adapted to highway construction. The chemical course offers several special lines of work. A student may prepare himself to become a general chemist or a teacher; may specialize in agricultural chemistry with a view to experiment-station work; or may elect industrial chemistry with the idea of obtaining a position in a factory, dyeing establishment, or along other technical lines. In the course in biology the student may take his major work in animal or in plant biology. The course offers special inducements as a preparation for the medical or veterinary school, or training school for nurses. It is likewise adapted to fit one to become a teacher, an assistant in an experiment station, or to take a government position in some biological line of work. The general science course, as the name implies, is not so special as the other courses. It offers a number of electives in history, the modern languages, and art. It is designed for those who wish a good general education in preparation for any line of life-work which they may follow. In the Senior year every student is required to prepare a thesis or report on some subject connected with the work of the course which he has chosen.

Preparatory Course.

Young men and young women who have had no opportunity to receive high-school instruction may enter this department to prepare for the college.

For entrance requirements and course of study, see pages 65–67.

Agricultural High School.

This course, embracing a large amount of practical agricultural instruction, is designed to meet the wants of those who feel that they cannot spend the time necessary for the completion of the full college course in agriculture.

For details regarding this course, see pages 68–71.

Industrial High School.

Students unable to pursue the regular college mechanical engineering course of four years, may take in connection with the preparatory school a two-years' course along one of the following industrial lines: carpentry, machine shop, mechanical draughting, steam engineering.

For details regarding this course, see pages 72–73.

Special Courses.

Whenever possible, students are urged to enter one of the courses leading to a degree. The arrangement of these courses is the result of careful thought and long experience as to the best combination of studies to fit one for the various occupations in which a technical education is required; and it is believed that no such thorough preparation can be obtained from special courses selected by the student.

However, any courses described in this catalogue may be taken by special students of maturity, who can satisfy the professor in charge of the subject chosen that they are prepared to derive benefit from such work.

Special Students in Agriculture.

Students having a working knowledge of the English branches may enter the college without examination and take those subjects which will prove of most direct benefit to them in the work of the farm. One or two years can thus be spent with excellent results. A certificate will be granted at the end of the time, showing the work covered.

Such a course may include studies chosen from the agricultural high-school course as well as those given in the college proper. Among the subjects which might be included are agricultural soils, plant life, drainage, agricultural implements and apparatus, farm fertility and its maintenance, field crops, breeds of farm animals, stock-breeding, feeding of farm animals, dairy-husbandry, poultry-raising, business arithmetic and farm accounts, social problems of the farmer, the principles of horticulture, fruit-growing, vegetable-gardening, landscape-gardening, physiology, entomology, bench-work, wood-turning, and forging. In connection with the above, other subjects for which the student is fitted may be taken. The study of English should generally be included.

A special course in farm practice, continuing six weeks, is offered before the Christmas holidays. A special course in poultry keeping, also continuing six weeks, follows the Christmas vacation. A special course in farm mechanics, given during the twelve weeks of the winter term, includes instruction in carpentry, mechanical drawing, piping (steam and gas), and blacksmithing. Payment of tuition fees for those outside the state and board for the full time is required in advance of students registering in the short special courses. Those interested in these courses will please send for circulars giving full description of them. Address the president.

Requirements for Admission to the College, 1905.

Graduates from high schools, and other schools of similar grade, are admitted without examination, on certificates which are filled out by their principals. The candidate must apply to the college for the certificate, giving the address of his principal who is to certify him. The college will correspond with the principal, furnishing blanks for him to fill. Graduates from high schools are not admitted on diploma. Satisfactory evidence as to good moral character must be presented to the committee on entrance examinations.

Candidates for admission who are not graduates of high schools must in all cases supply a statement of such school records as they may have made, and also a certificate or testimonial of good moral character. The latter may be from some recent teacher, from a pastor, or from other responsible parties.

Candidates not entering the Freshman class on certificate will be examined in arithmetic; algebra; plane geometry; English grammar; advanced English; one year of German, French, or Latin.

In the arithmetic examination especial attention will be paid to fractions, the metric system, simple and compound proportion, and square root; thorough drill in mental arithmetic will be necessary. The applicant should have mastered all of Wentworth's School Algebra as far as page 293, and Wells's Plane Geometry, or their equivalents.

The English requirements are those prescribed for entrance to the New-England colleges. The student will be expected to show familiarity with the works named below. These are divided into two classes. Those marked (*a*) are to be read, and the candidate will be required to show a general knowledge of their subject-matter and of the lives of the authors. Those marked (*b*) are to be thoroughly studied, so that the candidate will be able to pass an examination upon their subject-matter and structure. To be acceptable, the candidate's paper must show a good knowledge of spelling, capitalization, punctuation, sentence and paragraph structure. The books prescribed for 1905 are the following: (*a*) Addison's The Sir Roger de Coverley Papers; Carlyle's Essay on Burns; Coleridge's The Ancient Mariner; Eliot's Silas Marner; Goldsmith's The Vicar of Wakefield; Lowell's The Vision of Sir Launfal; Scott's Ivanhoe; Shakespeare's The Merchant of Venice, and Julius Cæsar; Tennyson's The Princess. (*b*) Burke's Speech on Conciliation with America; Macaulay's Essays on Milton and Addison; Milton's L'Allegro, Il Penseroso, Comus, and Lycidas; Shakespeare's Macbeth. For 1906: (*a*) The Sir Roger de Coverley Papers; Coleridge's The Ancient Mariner; Eliot's Silas Marner; Irving's Life of Goldsmith; Lowell's The Vision of Sir Launfal; Scott's Ivanhoe and the Lady of the Lake; Shakespeare's Macbeth, and The Merchant of Venice; Tennyson's Idyls of the King. (*b*) Burke's Speech on Conciliation with America; Macaulay's Essay on Milton, and Life of Johnson; Milton's L'Allegro, Il Penseroso, Comus, and Lycidas; Shakespeare's Julius Cæsar.

The language requirements cover one year's work in either French, German, or Latin; and Latin is recommended. In French and German this requirement comprises the essentials of grammar, easy reading, and elementary composition. In Latin the candidate must be prepared to study Cæsar. The following text-books are recommended: Chardenal's Complete French Course or Longman's French Grammar (Complete Edition), Super's French Reader or Aldrich and Foster's; the Joynes-Meissner German Grammar, Part I, Collar's Shorter Eysenbach or Lange's German Method for Beginners, Guerber's Märchen und Erzählungen, Part I, or about one hundred and fifty pages of easy reading; Collar and Daniel's First Latin Book, or Lindsay and Rollins's Easy Latin Lessons.

Candidates may enter any of the higher classes for which they are prepared.

Opportunities Offered to Women.

The courses of instruction are open to men and women alike. The women's dormitory will accommodate a limited number of students, and the college will on application find boarding-places for others in private families in town. Special waiting and study-rooms are provided for the women who are day students. Through the efforts of the young women and the generosity of members and friends of the college, a piano has been secured for the women's dormitory, where it is also accessible to the day students.

Expenses for Women.

Room-rent is free in compensation for certain required duties. Fuel and lights are supplied at cost. Rooms are provided with necessary furniture, including mattresses, but no other bedding material. Other expenses are as given below. The women have an opportunity to do their own washing and ironing. A Singer and a Household sewing-machine are at the disposal of all those living at the dormitory.

*Expenses.

Tuition is free to residents of Rhode Island. To non-residents, tuition is $10.00 a term or $30.00 a year; this applies only to students entering after July first, 1905.

The regular college expenses are tabulated below. Students should add a sum varying from $10.00 to $25.00 per year for miscellaneous expenses connected with college life.

		Minimum.	Maximum.
Board, $3.50 per week for 36 weeks		$126 00	$126 00
†Room rent in men's dormitory, including heat and light:			
Fall term	$12 00		
Winter term	10 00		
Spring term	8 00—	30 00	30 00
Incidental expenses for all students, $3.00 per term		9 00	9 00
Laboratory fees, $2 to $10 per term		6 00	30 00
Books		15 00	30 00
Laundry, 30c to 60c. per week		10 80	21 60
Uniform for military drill, $15.00		7 50	30 00
		$204 30	$276 60

FEES.—The amount of laboratory fees varies from $1.00 to $10.00 per term, depending upon the laboratory work taken. For each of the following $1.00 per term is charged: botanical and zoölogical laboratories; carpenter shop; wood-turning, forge shop, machine shop, and wood-carving. Fees for physics are as follows: for preparatory students, $1.00 per term; for Freshmen, $1.50; for Sophomores, $2.00. This pays for the material ordinarily used in class work and for the wear and care of tools and apparatus. Any person who breaks apparatus or tools, through carelessness or neglect of instructions, will be charged the cost of the same. The chemical laboratory fee is $3.00 per term for qualitative, quantitative, and organic laboratory work. This covers general chemicals and use of apparatus. Students are required to pay for breakage and for any chemicals they may use in making special preparations for themselves. A fee of $3.00 is also required in the electrical laboratory. A fee of fifty cents will be charged for each examination to make up a

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*For exceptions in expenses for women, see above.

†There will be no refund for room rent except by special arrangement with the president of the college.

condition. Graduates pay the cost of diplomas, $5.00. *No diploma will be issued until the candidate has paid all term bills.*

UNIFORM.—Every able-bodied male student is required to drill and to wear a uniform. The uniform must be paid for immediately on entering the college, when the students are measured for the suits. When worn only on drill and properly cared for, one uniform may last two or more years. The student may, however, wear his uniform all the time.

DAY STUDENTS.—Day students will be charged an incidental fee of $3.00 per term, the same as other students, payable in advance. They may, if they wish, deposit $5.00 in advance at the college store to cover cost of books. The college conveys students daily to and from the railroad station free of charge. Once at the beginning and end of each term, a team conveys trunks to and from the station.

BOARDING STUDENTS.—Boarding students shall deposit $50.00 each term, or give bond for $200.00 for the payment of all bills. No bond will be accepted from any member of the faculty. The price of board for 1905–6 will be $3.50 per week. Students who *leave regularly every week* on Friday afternoon and return Monday morning will pay $2.50 per week. No other reduction on board is made for less than five whole days' absence at one time, and this only when due written notice has been given. No person will be admitted to the dining room until he has secured a dining-room card from the matron. After this card is issued, all charges for board will be made in accordance therewith unless the student has the card changed by the matron. All questions relative to bills for board must come before the matron, and her statement of bills will be accepted by the college office. Arrangement of charges for meals sent to students' rooms for any cause must be made in advance with the matron.

FURNITURE.—*All students in the men's dormitory are required to supply their own furniture and bedding.* The necessary furniture may be obtained at the college when desired. A room may be furnished for from $8.00 to $10.00. Iron bedsteads three feet wide are included under room-rent. The furniture, if properly kept, may be sold, when the student leaves, for one-half to three-fourths the original price.

ROOMS IN THE VILLAGE.—At present the dormitory facilities for young men are taxed beyond their capacity. Students especially desirous of rooming in the dormitory are advised to make their applications at once. It is probable that most of the dormitory rooms will be occupied by the older students. Arrangements have been made for rooms, however, in the village of Kingston, some of these being under college management and others in private houses. In the case of the former, room-rent will vary from 60 cents to $1.00 per week, with stoves and bedsteads furnished, the student to provide other furnishings and fuel himself. Furnished rooms in private houses for students who occupy them throughout the college year range from $1.25 to $2.00 per week.

College Store.—Students will be required to pay cash at the store for all supplies except books. Students having sufficient deposit may have books charged to their account. Other students will have to pay cash for books as well as for supplies.

Damage Fund.—All damages not due to ordinary wear shall be assessed to students as follows:

1. Students at once acknowledging damages and agreeing to pay for same will be assessed actual cost of repair, including labor.
2. Students found guilty of such damages but not acknowledging and settling for the damage will be charged double the cost of repair.
3. Students will be responsible for damages in their own rooms.
4. Damages that are not settled as above may be assessed to all the students or to a group of students, pro rata. Each case and the amount of assessment will be considered on its merits.

Self-Help.

There is a certain amount of labor about the college buildings, on the farm, at the experiment station, and in the offices and laboratories, for which students will be employed whenever it is feasible to do so. Industrious students frequently earn an amount which aids considerably in paying their expenses, a sum varying from $25.00 to $125.00 per year.

In view of the fact, however, that the amount of this work is strictly limited and that it is not the policy of the college to create such work, and, furthermore, because of the increasing number of students and the more frequent applications for student labor, it seems desirable to state the conditions under which this work will hereafter be assigned.

Preference will be given to such students as are in most need of this labor for support while in college. New students desiring labor should bring a statement from parent or guardian, form for which will be furnished, showing to what extent the student must depend upon himself for support. Preference will generally be given to students who have been in attendance for at least a year, and to students who room and board at the college.

Any student accepting labor must maintain a fair record both in deportment and in the classroom. No student will be kept at work who does not give reasonable satisfaction. Any student abusing privileges incidental to his duties as student laborer will be considered inefficient and his work withdrawn. Payment for this service will vary from ten to fifteen cents per hour, according to the grade and difficulty of the work and the experience of the student. In general, students should not expect more than ten cents an hour for the first year. It is a rule of the college that any student desiring to perform more than twenty hours of student labor per week must secure permission from the faculty council. In the future, it may be necessary to limit the amount which any one student may receive for student labor.

Some young people have the impression that the college offers such opportunities for self-help that it is safe to enter with practically no funds, relying solely on money earned while here. In exceptional cases this may be done, but prospective students are strongly advised not to enter until they have at least $100.00 at their disposal. A student who has to make his own way must also plan to work steadily during both the short and long vacations. Occasional vacation work at the college can be furnished to students, but as a rule they should look elsewhere for this class of work.

Regulations of the College.

Conditions.—Section 1.—Any student absenting himself from more than ten per cent. of the total number of recitations in any subject shall not be allowed to take his examination in that subject, except by special vote of the faculty council, but shall be conditioned.

Section 2.—No student shall begin or drop a study without the consent of the committee on schedule and classification or of the master of the preparatory school, the penalty for dropping such subject being a condition.

Section 3.—Examinations of conditioned students shall be held only at the beginning of each term: in September, on Monday at 1 P. M. and Tuesday at 9 A. M. of the week the term opens; in January and April, on the morning of the day before the term opens—at 9 A. M. Any student who, after such examination, shall still have three or more conditions shall be obliged to withdraw from the college. Students still having not more than two conditions may take second examinations at the next regular time, and, failing to pass, shall have no further opportunity to remove such conditions except by special vote of the faculty council.

Section 4.—A fee of fifty cents will be charged for each examination to make up a condition.

Section 5.—A student wishing to take an examination to remove a condition must make application for the same, to the instructor in whose subject the condition was received, as soon as possible before the date of the examination.

Section 6.—Students, whether regular or special, shall remove entrance conditions to both the preparatory school and the college within a year from the date of entrance, unless excused by the committee on schedule and classification.

Section 7.—At the opening of a term, any student previously registered in one of the three upper classes of the college who has two conditions shall be classified as a member of the next lower class.

Thesis.—Section 8.—Every student who is a candidate for a degree shall prepare a thesis, and shall submit it to the president of the college at least one month before the time for granting the degree.

Student Publications.—Section 9.—No student shall publish any article in any college, class, or society publication designed for public circulation, or deliver any address on the college campus attended by persons other than students, without the consent of the president or some person appointed by him for granting such permissions.

Athletics.—Section 10.—No student shall represent the college on the athletic field, or in any other organization before the public, who is not regularly registered and in good standing; by good standing is meant conformity to all the rules of the college.

Religious Influences.

This college is a state institution, and, consequently, the widest latitude is given to all creeds and forms of religious belief. Simple chapel exercises are held every school-day morning and are conducted by the president or some other member of the faculty. All students are expected to attend chapel.

A branch of the Intercollegiate Young Men's Christian Association is doing active work among the men students, holding a meeting every Sunday afternoon throughout the year and also a brief noon meeting on some weekday. This association conducts courses in bible study and is taking the lead in endeavoring to establish sound and high ideas of college life.

The Young Women's Christian Union is doing a similar work for the young women.

The village church cordially invites all students to attend its services and, if possible, to join its membership. Every effort is made by the college to minister to the higher life of the students and to bring before them the noblest ideals, without in any way attempting to coerce them to particular beliefs.

Thursday Lectures.

From time to time speakers from abroad, both clergymen and laymen, are invited to address the students upon various subjects. Members of the faculty have also been among the lecturers. The list of speakers for the fall and winter terms was as follows:

1904.
Sept. 15. Pres. Kenyon L. Butterfield, A Word to New Students.
20. Rev. E. Tallmadge Root, Providence, Don't Study the Bible; Read it.
Oct. 6. Hon. George H. Utter, Westerly, Some Debts.
13. Prof. Fred W. Card, Does Agriculture Offer a Satisfactory Occupation for Educated Young Men and Women?
20. Mr. J. D. Towar, Lansing, Michigan, Life in Australia.
27. Hon. Gardiner C. Sims, Providence, The Repair Ship Vulcan.
Nov. 3. Rev. Malcolm Dana, Kingston, The Religion of an Educated Man.
10. Col. Geo. Spencer Merrill, Peace Dale, The Mark of the Man.
17. Miss Mabel D. Eldred, Dutch Painters.
Dec. 1. Gov. L. F. C. Garvin, Providence, The Duty of College Graduates as Citizens.
8. Rev. E. S. Rousmaniere, Providence, The Men We Need.

1905.		
Jan.	5.	College Songs.
	12.	Mr. M. Minassian, Arlington, Mass., The Armenian People.
	19.	Hon. Rowland G. Hazard, Peace Dale, The Relative Benefits to Laboring Men of the Trades Union and Profit-Sharing.
	26.	Rev. C. M. Melden, Providence, Sowing and Reaping.
Feb.	2.	Mass Meeting on Athletics.
	9.	Prof. W. E. Drake, Favorite Hymns.
	16.	Mrs. Benjamin F. Livingston, Providence, Temperance.
	23.	Mass meeting of students for general discussion.
Mar.	2.	Public session of the College Debating Club.
	9.	Rev. Edward F. Sanderson, Providence, Repentance Forward.
	16.	Rev. Frederick Lynch, New York City The Illumination of Labor.

The Rhode Island College Lecture Association.

Faculty and students, uniting with residents of the vicinity, conduct a winter lecture course, the aim of which is to introduce talented speakers upon subjects both entertaining and instructive. The association may be looked upon as a permanent and important factor in college activities. For the season of 1904–1905 the following lecturers were secured:

Dec.	16.	Rev. Scott H. Hershey, Ph. D., The Fellow on Top.
Jan.	27.	Frederick A. Cook, M. D., Peary's Progress Towards the Pole.
Feb.	17.	Frederick W. Bancroft, Scottish Songs and Singers.
Mar.	17.	William Elliott Griffis, D. D., L. H. D., Fun, Fact, and Fancy about the Japanese and Their Country.
April	14.	Col. Thomas Wentworth Higginson, People I Have Met.

The Library.

The library occupies a large room in Lippitt Hall and numbers nearly thirteen thousand volumes. The books are arranged in stacks, to which the students have free access. The Dewey system of classification is used; and a dictionary catalogue gives author, subject, and title. As the library has been from the first intended for reference work, the various departments of instruction have made their selections with the greatest care. Combined with the library is the reading-room, where one hundred of the leading periodicals—of literary, scientific, and general interest—are on file. From time to time these are bound, and prove of great value in research work.

The library is open every week day from 7:30 A. M. to 6:00 P. M., with the exception of a half-hour at noon. The librarian or her representative is in constant attendance to aid any one in search of information. As the college is an institution designed to further the educational interests of Rhode Island, all residents of the state are at liberty to use its library.

Location.

The college campus is one and a half miles from Kingston station, which is at the junction of the main line of the N. Y., N. H. & H. R. R. with the Narragansett Pier branch, thus insuring excellent railroad accommodations. The buildings are on a hill which commands an extended view of the surrounding country—a location both healthful and beautiful.

Departments of Instruction.

The following subjects are offered in the different departments. All studies required of regular students lead to the degree of Bachelor of Science.

Chemistry.

DR. LEIGHTON, DR. WHEELER.

Instruction in chemistry begins with the Freshman year and consists of lectures, recitations, and laboratory work; two hours of laboratory work being counted as equivalent to one period of recitation or lecture work. General chemistry extends through this year: two periods per week being devoted to lectures and recitations, and one period to laboratory work. Qualitative analysis extends through the first and second terms of the Sophomore year, a portion of the time being given to lectures and recitations, but the greater part to practical work in the laboratory.

The above subjects are required of all candidates for a degree, as essential to a liberal education, and are preparatory to the subsequent subjects which are designed for students desiring to make chemistry their profession, either as teachers or practical chemists. The more advanced subjects furnish an excellent preliminary basis for the study of medicine, biology, or agriculture.

The subject of stoichiometry and theoretical chemistry is begun in the general chemistry and continued in the third term of the Sophomore year, much attention being given to the application of the principles to problems. Inorganic preparations occupy three periods per week in the first term of the Junior year. Quantitative analysis is also taken up in this term, and extends throughout the Junior year. Organic chemistry begins in the first term of the Junior year, and extends through five terms. It includes much laboratory work in organic preparations. The subject of theoretical chemistry, begun in general chemistry and continued in the Sophomore year, is taken up in a much more advanced way in the first term of the Senior year, a portion of the time being devoted to laboratory work. The subject also affords opportunity for work in advanced inorganic chemistry, gas analysis, mineralogy, blowpipe analysis, assaying, sanitary chemistry, industrial chemistry, physiological chemistry, agricultural chemistry, toxicology, and textile coloring. In the Senior year, candidates for a degree in the chemical course are required to prepare a thesis on some chemical subject.

Instruction in agricultural chemistry, as applied especially to poultry foods, their use and digestion, is given to students in poultry-raising. Agricultural chemistry, embracing the chemistry of soils, composition of fertilizers, their manufacture and use, and the composition and analysis of fodders and their feeding-values, is offered to agricultural students in the Junior year.

The laboratory is thoroughly equipped with apparatus for the above-mentioned subjects, and opportunity is given for graduate students to continue work in the above lines beyond that required for a degree. A large number of German, French, and English chemical journals are accessible, thus affording excellent opportunity for research work.

Subjects.

I. General Chemistry.—Lectures, recitations, and laboratory work. *Throughout the Freshman year.* Lectures and recitations, 2 *exercises per week;* laboratory work, 1 *exercise of* 2 *hours per week. Required of all candidates for a degree.*

II. Qualitative Analysis.—Basic and acid analysis; analysis of salts. Industrial and natural products. Lectures, recitations, and laboratory work. *Fall and Winter terms, Sophomore year;* 3 *exercises of* 2 *hours each per week. Required of all candidates for a degree.*

III. Inorganic Preparations.—*Fall term, Junior year;* 3 *exercises of* 2 *hours each per week. Required of students in the Chemical course.*

IV. Stoichiometry and Theoretical Chemistry.—Lectures and recitations. *Spring term, Sophomore year;* 3 *exercises per week. Required of all students in Agriculture and Science.*

V. (A) Quantitative Analysis.—Gravimetric and volumetric analysis. Analysis of minerals. *Throughout the Junior year;* 3 *exercises of* 2 *hours each per week. Required of students in the Chemical course.*

V. (B) Quantitative Analysis (Advanced).—Analysis of minerals, ores, alloys, and industrial products. *Throughout the Junior year;* 3 *exercises of* 2 *hours each per week. Required of students in the Chemical course.*

VI. Organic Chemistry.—Lectures, recitations, and laboratory work. *Fall and Winter terms, Junior year:* lectures and recitations, 3 *exercises per week;* laboratory work, 1 *exercise of* 2 *hours per week. Required of students in the Chemical course.*

VII. Organic Preparations.—*Spring term, Junior year;* 3 *exercises of* 2 *hours each per week. Required of students in the Chemical course.*

VIII. Sanitary Chemistry.—*Winter term, Junior year;* 2 *exercises of* 2 *hours each per week. Required of students in the Chemical course.*

IX. Mineralogy and Blowpipe Analysis.—*Winter term, Junior year;* 3 *exercises of* 2 *hours each per week. Required of students in the Chemical course and in Highway Engineering.*

X. Gas Analysis.—*Spring term, Junior year;* 1 *exercise of* 2 *hours per week. Required of students in the Chemical Course.*

XI. Assaying.—*Spring term, Junior year;* 1 *exercise of* 2 *hours per week. Required of students in the Chemical course.*

XII. Industrial Chemistry.—Lectures and recitations. *Spring term, Junior year,* and *Fall term, Senior year;* 3 *exercises per week. Required of students in the Chemical course.*

XIII. Organic Chemistry (Advanced).—*Fall and Winter terms, Senior year;* 3 *exercises per week. Required of students in the Chemical course.*

XIV. Theoretical Chemistry (Advanced).—Lectures, recitations, and laboratory work. *Fall term, Senior year:* lectures and recitations, 3 *exercises per week;* laboratory work, 2 *exercises of* 2 *hours each per week. Required of students in the Chemical course.*

XV. Physiological Chemistry and Toxicology.—*Spring term, Senior year;* 3 *exercises of* 2 *hours each per week; elective.*

XVI. Textile Coloring.—*Fall and Winter terms, Senior year;* 3 *exercises per week. Optional for students in the Chemical course with Chemistry XVIII and XIX as alternatives.*

XVII. Agricultural Chemistry.—*Spring term, Senior year;* 3 *exercises per week. Required of students in the Chemical course.*

XVIII. Electro-Chemistry.—*Winter term, Senior year;* 3 *exercises per week. Optional for students in the Chemical course with Chemistry XVI as alternative.*

XIX. Metallurgy.—Lectures and recitations. *Fall term, Senior year;* 3 *exercises per week. Optional for students in the Chemical course with Chemistry XVI as alternative and required in Fall term, Junior year, of students in Engineering courses.*

XX. (A) Advanced Inorganic Chemistry.—*Winter Term, Senior year;* 3 *exercises per week. Required of students in the Chemical course.*

XX. Thesis Work.—*Throughout the Senior year. Required of students in the Chemical course.*

Physics.

PROFESSOR TOLMAN, MR. W. S. RODMAN.

The instruction in physics is given with reference to the particular needs of the students in the different courses. It begins with the Freshman year and consists of lectures, recitations, and laboratory work.

In the Sophomore year the work is designed more especially for the students in engineering, and is intended to introduce them to many of the problems with which they must deal in engineering work.

Some standard text-book suited to the needs of the students in the different courses is used. This is supplemented by lectures and problems illustrating the laws of physics.

Subjects.

I. General Physics.—Study of mechanics, hydraulics, pneumatics, and heat, *Fall term;* electricity and magnetism, *Winter term;* sound and light, *Spring term, Freshman year:* 2 *recitations per week;* laboratory work, 1 *exercise per week. Required of all students in Agriculture and Science courses.*

II. General Physics.—*Throughout the year;* 4 *exercises per week. Required of Sophomores in Engineering courses.*

Mineralogy and Geology.

DR. LEIGHTON, DR. WHEELER.

GENERAL MINERALOGY.—General mineralogy is taught in the winter term of the Junior year, and consists of three exercises per week. A short course dealing with the elements of crystallography is given, together with the physical and chemical characteristics of minerals, especially of the rock-making minerals composing our soils. Laboratory work in blowpipe analysis and physical determination of minerals follows the crystallography.

GEOLOGY FOR AGRICULTURAL AND HIGHWAY-ENGINEERING STUDENTS.—Under this subject historical geology is considered in outline, attention being given, also, to those phases of dynamical and structural geology which are particularly important. Special attention is given to rock weathering and soil formation, and to those characteristics of rocks which are of chief importance in connection with road construction.

Subjects.

III. Mineralogy.—See Chemistry IX. Dr. Leighton.

IV. Geology for Agricultural and Highway-Engineering students.—Lectures and recitations. *Spring term, Junior year;* **3** *exercises per week. Elective.* **Dr. Wheeler.**

Botany.

PROFESSOR MERROW.

The required work in botany for students in agriculture and the science courses begins in the fall term of the Sophomore year with the biology of plants, which continues three terms. The aim of this subject is to give the student a knowledge of plant life, by the study of the plants themselves in the laboratory and in the field. Attention is given to representatives of the vegetable kingdom from the lowest to the highest. Some time is given to the determination of species, but emphasis is placed on the structure of the plant, its activities, and its relation to its environment. In short, the subject is adapted to the needs of the general student who desires a knowledge of the principles of biology as illustrated by our common plants, and also furnishes a good foundation to the student who is to follow more advanced work in botany, agriculture, horticulture, or medicine. Elementary agricultural botany is given in the agricultural high school, and is described with the other subjects of that school. Students wishing to emphasize botany in their choice of studies are given every opportunity to follow lines of work best suited to their needs. Excellent advantages are offered to those who wish to elect work in plant pathology. The laboratory keeps in store a supply of dry and alcoholic material for the study of parasitic fungi, and collecting fields for fresh material are near at hand. Each student is supplied with a compound microscope, a dissecting microscope, re-agents, and small instruments. The laboratory is equipped with apparatus for simple physiological experiments, a microtome, paraffin bath, stains, thirty Brendel models, Briosi and Cavara's Parasitic Fungi of Cultivated Plants, Ellis's Fungi Columbiani, Seymour and Earle's Economic Fungi, Arthur and Holway's Uredinæ, and an herbarium of native plants. A good working library, including several American and foreign periodicals, is an important part of the equipment of the laboratory.

Subjects.

I. Biology of Plants.—Lower plants are studied the first half year, seed plants the second half year. Laboratory, reading and lectures. *Throughout the Sophomore year; 3 exercises of 2 hours each per week. Required of students in the Science courses.*

II. Pathology.—A study of the nature and the causes of plant diseases and the remedies for them. Laboratory, field work, reading and lectures. *Elective; open to students who have taken Botany I. Hours arranged with instructor.*

III. Histology.—Laboratory, reading, and lectures. The laboratory work includes methods of imbedding, sectioning, staining, and mounting. *Elective; open to students who have taken Botany I. Hours arranged with instructor.*

IV. A study of the Spring Flora of Kingston, considered from an ecological and systematic standpoint. Special attention is given to the rose family. The major part of the time may be given to herbaceous forms or to trees and shrubs. Field and laboratory. *Spring term; 3 exercises per week. Elective; open to students who have taken Botany I.*

V. A study of the Fall Flora of Kingston, considered from an ecological and systematic standpoint. Special attention may be given to weed-plants, grasses, and the clover family, or the student may give his attention chiefly to trees and shrubs. Field and laboratory. *Fall term; 3 exercises per week. Elective; open to students who have taken Botany I.*

VI. Plant-Life.—A study of the plant and its environment. Nutrition, growth, reproduction, plant diseases and their remedies are treated. Lectures and reading, illustrated by models, charts, demonstrations, and field and laborartory work. *Given six weeks in the Winter school of Farm Practice.*

By consulting the instructor other arrangements may sometimes be made for those desiring to elect work in botany.

Zoölogy.

PROFESSOR BARLOW.

The work in zoölogy begins with a general subject running through the year. Three periods, each two hours long, are given to this work. Beginning with the lowest and most simple forms of life, type forms from each important group are studied. Neatness and precision in dissection and accuracy in drawing are emphasized. During the fall term protozoans, coelenterates and echinoderms are studied. Then follows a study of worms, arthropods and mollusks, and in the spring term the vertebrates are taken up. This general subject is considered essential to an understanding of the more practical studies which follow in the course, and is required of all Sophomores in the science courses.

Electives are offered in anatomy, physiology, embryology, histology, and economic entomology. Subjects V (A) and III (B) are specially designed to meet the needs of those who are preparing to study medicine or veterinary science. Subject VII (A) is designed to be of value to those who are to take up any of the various lines of agriculture and animal industry.

Instruction is largely by laboratory work and lectures. Text-books are used, and much reference work in standard texts and current periodicals is required.

Especial facilities for the study of the smaller farm animals are afforded by the college farm and experiment station poultry-yards. The experiments now in progress in the "hothouse" plans of raising poultry give unequalled advantages for study in this line. The rapid reproduction of poultry, rabbits, etc., makes them ideal material in studying living processes.

The marine fauna, occurring at a short distance from the college, in the ocean, Narragansett bay and numerous estuaries; the fresh-water fauna, occurring in the springs, ponds, and streams near by; together with an abundant land fauna of the smaller types of mammals, birds, reptiles, amphibians, fish and insects, make the locality especially favorable for field work.

For indoor study the department is well equipped with Leuckart's charts; Zeigler's and other models; manikins elucidating the anatomy of man, horse, and fowl, skeletons of all the domestic animals; a series of the principal vertebrated forms, each type being represented by skeleton and mounted skin. The collection includes many rare and remarkable forms from distant parts of the earth, such as the lung fishes, Hatteria, the wingless birds of New Zealand, and many Australian forms. The invertebrate series is represented in a similar way. The collection of Rhode Island birds is practically complete, and most of the reptile and batrachian species of the state are represented.

The laboratory is provided with microtome, microscopes, and all necessary apparatus for microscopic work. In the library is the best literature upon the subject, and a number of the leading current zoölogical journals are available at the experiment station or by special arrangement.

Subjects.

I. (B) Animal Biology.—A study of selected types of the leading animal phyla, beginning with the low forms and advancing systematically to the vertebrates. *Throughout the Sophomore year;* 3 *exercises of* 2 *hours each per week. Required in the Science courses.*

III. (B) Physiology.—Comparative physiology of mammals. *Winter and Spring terms;* 2 *recitations and* 1 *laboratory exercise of* 2 *hours per week. Open to students who have taken V (A) and Chemistry VI.*

IV. (A) Embryology.—The development of the chick and frog. *Spring term;* 3 *exercises of* 2 *hours each per week. Elective; open to students who have taken Zoölogy VI.*

V. (A) Vertebrate Anatomy.—Detailed study of the cat. *Fall term;* 3 *exercises of* 2 *hours each per week. Elective.*

VI. Normal Histology and Histological Methods.—*Winter term;* 3 *exercises of* 2 *hours each per week. Elective; open to students who have taken course I (B).*

VII. (A) Entomology.—Lectures, laboratory and field work. Special attention is given to forms of economic importance. *Throughout the year;* 3 *exercises of* 2 *hours each per week. Elective.*

VIII. (A) More advanced work in special topics may be taken up by special arrangement with the instructor.

Psychology.

I. Elementary Course.—Lectures, recitations, simple laboratory experiments. *Winter and Spring terms;* 3 *exercises per week. Elective for Juniors and Seniors.*

Agriculture.

PROFESSOR CARD, DR. CURTICE, DR. WHEELER, MR. TYLER, MR. BURDICK.

The science of agriculture rests upon many sciences. Thorough training in agriculture therefore presupposes a foundation knowledge of these sciences. This foundation must be obtained in other departments of the institution.

The object of an agricultural education is to emphasize the why of farming rather than the how. In other words, it is the special province of an agricultural college to deal with the principles which underlie the various operations of the farm rather than with the methods of performing those operations. In doing this it does not underestimate the importance of knowing how to do farm work. It recognizes fully that there can be no complete success without such knowledge, but it believes that the average student can better learn these things on a well-managed, up-to-date farm than at an agricultural college. He can there gain experience and earn wages at the same time. At college he is on expense and earning nothing. Some practical operations can be better learned at college than elsewhere. These things the college will try to teach. It will not try to teach a man to become expert in hoeing corn or in digging potatoes. To teach such things would mean that the student must miss many things of value which the college can teach and the farm cannot.

A college course in agriculture should teach a man those things which will enable him to make a success of his profession. It should do more; it should give him an educational training which will enable him to become a leader in the affairs of men. The world needs farmers; it need men among farmers more. It is calling for such men. It offers them a liberal share of its rewards. Positions are waiting, opportunities are opening, possibilities exist on every farm. To train men to fill these positions, to embrace these opportunities, to see the possibilities, is the object of the course in agriculture.

SPECIAL COURSE IN FARM-PRACTICE.—A special course in farm-practice was inaugurated in the fall of 1901, occupying six weeks immediately preceding the Christmas holidays. The design of this course is to give clear-cut, practical instruction in agriculture.

It aims to emphasize a study of the soil and the plant as constituting the foundation of successful farm practice.

The following subjects are taken up during the course; soils and fertilizers, how soils are made, kinds of soil, the purchase, mixing, and use of commercial fertilizers; soil management, effects and methods of tillage, humus supply, moisture conservation, rotations, and cover crops; field crops; fruit-growing; vegetable-gardening; the feeding and breeding of live stock; agricultural physics, mechanics as applied to farm implements, soil physics, drainage; the plant, its method of life and its enemies; insect life, enemies of the farm and garden; wood-work; iron work, farm business. Practical men from outside the college aid in the instruction.

The expenses are kept as low as possible. A certificate of attendance is given at the completion of the course. No entrance examination is required.

SPECIAL COURSE IN POULTRY-KEEPING.—A special course in poultry-keeping continues for six weeks immediately following the Christmas vacation. The aim of the course is to give pointed, practical instruction in the science and art of poultry-keeping and to present the latest and best methods in practice and management. This, the pioneer course in poultry-keeping, has been in progress for the past seven years and has proved uniformly successful.

Theoretical or practical teaching is given in the following subjects: zoölogy, including anatomy, physiology and embryology; breeds of fowls and their origin; principles of breeding, mating, care and management; incubation and brooding; chemistry of foods; feeding; egg and flesh production; caponizing; fattening; killing, dressing and marketing; the prevention of diseases; poultry plants—including location, drainage, buildings, drawing of plans, specifications, estimates, construction, ventilation, and heating; records and accounts; crops raised for poultry or as an adjunct to the business.

The practical work includes individual practice in artificial incubation and brooding, and in the preparation of fowls for market. Frequent excursions are made to typical poultry plants for a study of their stock and practical management. An annual trip is made to either the Boston or New York poultry show. One of the strong features of the course consists in the fact that the students are brought in contact with a large number of practical poultrymen, who come to the college annually to assist in the instruction.

Early enrollment is necessary for admission to this course, as the number of applications frequently exceeds the number of students that can be accommodated. No entrance examinations are required. Certificates of attendance are given to deserving students at the close of the course.

Subjects.

I. Soils and Fertilizers.—Origin and formation of soil; chemical properties; influence of chemical constituents upon the physical conditions and biology of the soil. Farm manures; artificial manures—composition, precautions and economy in using, influence upon the soil and plants; action of soils and of plants upon manures; formulas for farm crops, with calculations of formulas. *Spring term, Junior year, 3 exercises per week. Required of Agricultural students.* Dr. Wheeler.

I. (A) The Soil.—Constituents; elements of fertility; texture; moisture; living organisms; under-draining; tillage; humus; temperature. This course treats of the physical characteristics of the soil as distinct from the chemical. *Fall term, Junior year; 2 class exercises and one laboratory period per week. Required of Agricultural students.* Professor Card.

II. Farm Crops.—Needs of the plant; maintenance of fertility and humus; rotations; pastures; meadows; grains; grasses; clovers; forage plants and roots. *Winter term, Junior year; 3 exercises per week. Required of Agricultural students.* Professor Card.

III. Farm Equipment.—Selection and equipment of farms; buildings, fences, roads, water supply, farm power, field machinery, and appliances. *Spring term; 3 exercises per week. Elective.* Professor Card and Mr. Burdick.

IV. Farm Management.—Farm capital, fixed and circulating; labor, manual and team; choice of a farm; ownership or rental; farm balance; implements and equipment; systems of farming; marketing problems; advertising; records and accounts; legal questions; coöperation; specific types of farming. *Winter term; 2 exercises per week. Elective.* Professor Card.

V. Agricultural Economics.—See Economics and Rural Sociology II.

VI. Farm Surveying and Drainage.—Mapping of fields; location of drains; leveling and construction of farm drains. *Fall term; 2 exercises per week. Elective.* Mr. Tyler.

VII. Farm Animals.—A study of the types, breeds, and care of different farm animals. *Fall term; 3 exercises per week. Elective.* Dr. Curtice.

VIII. Farm Animals.—Principles of feeding, nutrition, assimilation, and excrementation; selection, composition, and digestibility of food-stuffs; feeding standards and compounding of rations; practice in the preparation of foods and methods of feeding; principles of hygiene and management. *Winter term; 3 exercises per week. Elective.* Dr. Curtice.

VIII. (A) Farm Animals. Principles governing their choice and breeding. *Spring term; 3 exercises per week. Elective.* Dr. Curtice.

Poultry Keeping.—Under subjects VII, VIII, and VIII (A) the student may substitute poultry-keeping for farm animals. The poultry course will essentially parallel that of Farm Animals, but be modified to suit its requirements. It is expected that students taking the poultry-course work will spend a certain portion of the Fall and Spring terms in incubation and brooding.

IX. Dairy Husbandry.—Care and management of dairy cattle; buildings and equipment; milk production, composition, management, aëration, pasteurization, sterilization, testing, preservation, transportation; creaming. *Spring term; 3 exercises per week. Elective.* Dr. Curtice.

XI. Agricultural Experimentation.—Objects, methods, and results of agricultural experimentation; precautionary measures; sources of error; interpretation of results. *Spring term; 2 exercises per week. Elective.* Dr. Wheeler.

XII. Agricultural Literature.—Seminary courses in the literature of special subjects. *By arrangement. Elective.*

XIII. Original Investigations.—For advanced students only. *By arrangement. Elective.*

XIV. Rural Sociology.—See Economics and Rural Sociology III.

XV. Handicraft Courses.—For students who wish training in the practical operations of agriculture, handicraft courses are open in the care of livestock, poultry-culture, fruit-growing, vegetable-gardening, use and care of farm machinery, etc. *By arrangement. Not to count toward a degree.*

Horticulture.

PROFESSOR CARD, MR. BLAKE.

Work in horticulture is designed for students from all courses. It is felt that some knowledge of the subject may very properly form a part of every well-rounded education.

In the introductory subject the aim is to discuss principles of general importance to all who have to deal with orchard or garden crops. The subjects of pomology and vegetable-gardening are designed to give practical instruction in the growing of fruits and vegetables.

Landscape-gardening is especially recommended to those who seek to appreciate the beautiful in nature or in art. Its aim is to apply the principles of beauty, as evinced in the work of nature, to the art of embellishing grounds.

Forestry touches problems of import to every citizen interested in the public welfare. Owing to the intimate relation between forests and waterflow, the subject is often of more vital importance to the manufacturer than to the farmer.

The subject of plant-breeding appeals chiefly to those interested in the broader problems of biological development and relationship. A careful study of the amelioration and development of plants under culture throws light upon many of the general problems of evolution which are of interest to all thinking students.

The subjects of reading and original investigation are designed chiefly for students who wish to make a specialty of horticulture.

Subjects.

I. Principles of Horticulture.—A discussion of fundamental principles underlying horticultural operations in orchard, garden, and greenhouse. *Fall term; 2 recitations and 1 laboratory period per week. Elective.* Mr. Blake.

II. Pomology.—Lectures and supplementary reading. Designed to give practical instruction in fruit-growing. *Winter term; 3 exercises per week. Elective.* Mr. Blake.

III. Vegetable Gardening.—Methods of growing garden vegetables in the open ground and under glass. *Spring term; 3 exercises per week. Elective.* Mr. Blake.

IV. Landscape-Gardening.—The principles underlying landscape-gardening as a fine art, with discussion of the ornamentation of home grounds, school grounds, cemeteries, parks, highways, and other public grounds. Lectures and supplementary reading. *Fall term; 3 exercises per week. Elective.* Professor Card.

V. Forestry.—General importance of forests, their influence on climate and water supply, methods of regeneration, and systems of forest management. Lectures and supplementary reading. *Spring term, Junior year; 3 exercises per week. Elective.* Professor Card.

VI. Plant-Breeding.—A discussion of the development of plants under culture, with especial reference to problems of heredity, environment, variation, selection, and evolution. Lectures and supplementary reading. Open to students who have had Botany I. *Winter term; 2 exercises per week. Elective.* Professor Card.

VII. Horticultural Literature.—A seminary course designed to give familiarity with horticultural writings, ancient and modern. *By arrangement. Elective.*

VIII. **Original Investigation.**—For advanced students only. *By arrangement. Elective.*

Languages.

The subjects grouped under this head are English, German, French, and Latin. For entrance requirements, see pages 18 and 19.

In all the college courses leading to a degree, three years of English and two years of foreign language study are required.

The aim of the department must necessarily vary with the language taught. In English the student is expected to gain increased facility in the correct use of his mother tongue as well as a large acquaintance with its best literature. In French and German, while practice in speaking and writing is constant, special emphasis is put upon a study of some of the literary masterpieces; and incidentally a good foundation is laid for the easy reading of scientific texts. The required year's work in Latin is looked upon as furnishing a valuable preparation for later language study and as being helpful in understanding scientific terms.

The library is a most important factor in the work of the department, as the English language and literature are represented in it by about one thousand carefully selected volumes and the French and German literatures by about six hundred.

Subjects.

ENGLISH.

PROFESSOR WATSON, MISS BOSTWICK.

*II. **Rhetoric.**—Text-book study and practical application of rhetorical principles in themes and exercises. *Throughout the Freshman year; 2 exercises per week. Required of all candidates for a degree.*

III. Critical study of certain prose masterpieces by Carlyle, Emerson, Lamb, Holmes, Thoreau, Burroughs, and Warner; with essays and various short papers. *Throughout the Sophomore year; 2 exercises per week. Required of all candidates for a degree.*

IV. **General English Literature.**—Largely a study of Chaucer, Shakespeare, Milton, Wordsworth, Tennyson, Browning, and their times. Essays and collateral reading required. Students are encouraged to special investigation along literary and historical lines. *Throughout the Junior year; 2 exercises per week. Required of all candidates for a degree.*

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*Course I, Elementary English, is given in the preparatory school.

V. Special English Literature.—Study of special periods and authors. *Throughout the year; 3 exercises per week. Elective; open to students who have taken courses I–IV or their equivalent.*

VI. Special Work in Themes.—*Throughout the year. Elective; open to students who have taken courses I–IV or their equivalent.*

GERMAN.

PROFESSOR WATSON.

I. Elementary German.—Grammar, dictation, conversation, reading of easy prose and poetry. *Throughout the year; 4 exercises per week. Required of all candidates for a degree who do not offer French.*

II. Reading of intermediate texts, composition, conversation. *Fall term, Sophomore year; 3 exercises per week. Open to students who have taken subject I or its equivalent, and required of all candidates for a degree who do not offer French.*

III. German Classics.—Gœthe, Schiller, Lessing. *Winter and Spring terms, Sophomore year; 3 exercises per week. Open to students who have taken subjects I and II or their equivalent, and required of all candidates for a degree who do not offer French.*

IV. (A) German Prose.—Freytag, Von Scheffel, Dahn. *Throughout the year; 3 exercises per week. Elective; open to students who have taken subjects I–III or their equivalent.*

VII. Scientific German.—Special work assigned by different professors. *Elective; open to those who have taken subjects I–III or their equivalent.*

FRENCH.

PROFESSOR WATSON, MISS BOSTWICK.

I. Elementary French.—Grammar, dictation, conversation, reading of easy prose and poetry. *Throughout the year; 4 exercises per week. Required of all Freshmen not taking German or Latin and not offering French for admission.*

II. Reading of intermediate texts, composition, conversation.—*Throughout the Sophomore year; 3 exercises per week. Required of all candidates for a degree who do not offer German.*

III. French Classics.—Corneille, Racine, Molière. *Throughout the year; 3 exercises per week. Elective; open to students who have taken subjects I and II.*

IV. (A) French Prose.—Hugo, Sand, Balzac, Loti. *Throughout the year; 3 exercises per week. Elective; open to those who have taken subjects I–III or their equivalent.*

VI. Scientific French.—Special work assigned by different professors. *Elective; open to those who have taken subjects I and II or their equivalent.*

LATIN.

MISS BOSTWICK.

*II. Cæsar or selections from various Latin authors. *Elective. Throughout the year; 3 exercises per week.*

History.

MISS KENYON, MISS BOSTWICK.

The aim of the work in history is to present and interpret the political, social, constitutional, and diplomatic development of the leading countries of Europe and America, and to foster scientific habits of study. The library contains more than a thousand volumes on history, and local records have been used for research work.

Subjects.

†II. American History.—Lectures, recitations, reports. The origin and early development of American institutions; the colonial policy of European states; intercolonial wars; the Revolution; the establishment, the development, and operation of the Constitution of the United States; political parties; the Civil War and Reconstruction. *Throughout the year; 3 exercises per week. Elective for Juniors and Seniors.* Miss Kenyon.

IV. European History.—Lectures, recitations, and reports. The sources of mediæval and modern civilization; the empire of Charles the Great; the feudal system; the crusades; the national growth of France, Germany, and England; the Renaissance; the Reformation, the French monarchy in the seventeenth century, the system of the balance of power, the Puritan Movement, the Revolution of 1688, the rise of Prussia, the French Revolution and a general survey of European history since 1815. *Throughout the year; 3 exercises per week. Elective for Juniors and Seniors.* Miss Kenyon.

VII. Hebrew History and Literature.—*Throughout the year; 1 exercise per week. Elective.* Miss Kenyon and Miss Bostwick.

V. Government.—Lectures, recitations, reports. *Fall term, Senior year; 3 exercises per week. Required of all candidates for a degree.* Miss Kenyon.

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*Elementary Latin is given in the preparatory course.

†Course I, General History, is given in the preparatory course.

Economics and Rural Sociology.

PRESIDENT BUTTERFIELD.

Subjects.

I. Political Economy.—Text-book, supplemented by lectures, readings, and essays. The first term is devoted to the general principles of the subject; second term, to consideration of present-day problems. *Winter and Spring terms, Senior year; 3 exercises per week. Required of all candidates for a degree.* President Butterfield.

II. Agricultural Economics.—The study of agriculture as an industry, from the point of view of political economy. Includes a study of the agricultural market; transportation of agricultural products; agricultural labor; farm ownership and tenancy; mortgages, etc. *Spring term; 2 exercises per week. Elective.* President Butterfield.

III. Rural Sociology.—Movements of the farm population—causes and results; general social condition of farmers, such as illiteracy, health, crime, etc.; personal and social traits developed by rural life; means of communication in rural communities; the rural school; agricultural education; the country church; farmers' organizations, federation of rural social forces. *Fall term; 2 exercises per week. Elective.* President Butterfield.

Mathematics.

DR. HEWES, MR. W. S. RODMAN.

All students study higher algebra, soild geometry, and plane trigonometry, in their Freshman year. These subjects offer good mental discipline and form the basis of future work in engineering. They include as applications the solution of numerical equations and problems involving logarithms, the measurement of volumes and areas, and solution of triangles.

Those who elect engineering courses study analytical geometry during the first two terms of the Sophomore year. In the spring term calculus is begun and is completed in the winter term of the Junior year. The remainder of this winter term and the spring term during the Junior year are occupied with the study of theoretical mechanics.

Throughout the work emphasis is laid on the direct application of the subjects to the actual problems that arise in the engineering courses of which they form a part. The student is made to feel the need of advanced methods of treatment simultaneously with the presentation of that treatment. It is the aim of the work principally to develop engineers with useful mathematical training.

Subjects.

*IV. Higher Algebra.—Permutations and combinations, applications of the principle of mathematical induction, theory and use of logarithms (not involving infinite series), determinants, elements of the theory of equations. *Winter term, Freshman year;* 4 *exercises per week. Required of all candidates for a degree.*

V. Plane Trigonometry.—Study of the six functions as ratios; proofs of the principal formulas; in particular the sine, cosine, and tangent of A+B and 2A. The use of logarithms and the solution of triangles with applications. *Spring term, Freshman year;* 4 *exercises per week. Required of all candidates for a degree.*

VI. Solid geometry (Phillips and Fisher).—The usual theorems relating to lines and planes in space. Calculation of cubic contents of polyhedra, the cone, sphere, and cylinder. *Fall term, Freshman year;* 3 *exercises per week. Required of all candidates for a degree.*

VII. Analytical Geometry.—The various co-ordinate systems and their relations. Derivations of the equations of the line, circle, and conics. Study of loci and methods of plotting. Detailed analysis of the equations of second degree in two variables. *Fall term, Sophomore year;* 3 *exercises per week. Required of students in the Engineering courses.*

VII. (A) Solid Analytical Geometry.—Co-ordinate systems in space and study of the line, plane, and quadric surfaces. Loci in space. *Winter term, Sophomore year;* 3 *exercises per week. Required of students in the Engineering courses.*

VIII. Calculus.—The differentiation of the ordinary functions and applications to geometry and engineering. Taylor's and Maclaurin's theorems, partial differentiation, maxima and minima of functions of one or more variables. Problems in physics and allied subjects. Methods of integration, theory of planimeter, applications to practical problems of geometry and mechanics. *Spring term, Sophomore year, and Fall term, Junior year;* 3 *exercises per week: Winter term;* 4 *exercises per week. Required of students in Engineering courses.*

IX. Theoretical Mechanics.—The laws of motion, forces acting at a point, and in a plane, parallel forces and centers of force, frictional resistance, principle of work, motions produced by constant and variable force. Motions of rigid bodies, impulsive forces. Solving of problems. *Spring term, Junior year;* 4 *exercises per week. Required of all students in the Engineering courses.*

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* Courses I, II, and III are given in the preparatory school.

Mechanical Engineering.

PROFESSOR DRAKE, MR. T. C. RODMAN, MR. KNOWLES, MR. KNIGHT.

The aim of this department is to give sound theoretical and thorough practical training to students who seek to prepare themselves for useful and responsible positions. Shop-work will furnish such training as will ensure, other things being equal, marked success in mechanical pursuits subsequent to graduation. The regular four-years' course deals with mechanical engineering as applicable to the industries carried on in New England and particularly in Rhode Island. Special attention is given to the designs and the economical operation of shops and mills, and of manufacturing and industrial machinery. The subjects of mechanism, metallurgy, heating and ventilation of buildings, engineering specifications, and laws of contracts are treated by lectures and textbooks. The several laboratories are well equipped for working in wood and metals and for the testing of materials used in construction. Students in the course of mechanical engineering receive instruction in bench-work in wood, wood-turning, pattern-making, forging, machine-shop work and mechanical drawing.

The carpenter shop contains benches and tools sufficient to accommodate twenty-four students at one time. The subject is designed to give skill and confidence in working the various kinds of wood, and also to impart a fair knowledge of the principles of building and construction. The wood-turning room contains thirteen lathes, each with its complete set of gouges and turning-tools. In the same room are benches for pattern-making, and also power machinery for working wood; such as circular saw, hand-saw, jig-saw, surface-planer, buzz-planer, mortising-machine, dowel-machine and others. All students take wood-turning, and during the period each has practice under the direct charge of the engineer in care of the shop, boiler, and engine. The engine is of thirty horse-power. The work in pattern-making given to the students in the mechanical department consists in the making of selected pieces to illustrate the principles of shrinkage, drafts, finish, core-box making, built-up work, and the general requirements of pattern-making.

The forge shop will accommodate twelve students at one time. It contains twelve forges and anvils, a stock-cutter, a bolt-header, a post-drill, and is well supplied with all the hammers, tongs, and other forge and anvil tools necessary for complete work. A regular course is followed here as in other lines; and for the students of the agricultural course the work is of such a nature as is found about a farm. The various operations of drawing, bending, upsetting, and welding are taught and applied in the making of such useful pieces as staples, hooks, chains, and iron work for farm tools. The students of the mechanical department follow a similar course, but in a direction more suited to the machine shop. Bolts, nuts, machine-forgings, chisels, and lathe tools are made, and afterward put to practical use. Only students in the engineering courses work in the machine shop.

Practice in the machine shop is designed to give a sure knowledge of and intelligent practice in the best modern methods of using the various tools; such as lathes, planers, drills, milling-machines, and grinding-machines. Hand work at the bench is offered, and includes instruction in chipping, filing, scraping, and finishing. Students of former years have made an engine, dynamo, speed lathe, full set of arbors, set of nut arbors, and a variety of other tools.

In experimental engineering the students make tests of engines, boilers, pumps, steam gauges, injectors, and a hydraulic ram. The strength of materials is investigated theoretically in class under the head of mechanics of materials, and practically in the laboratory by conducting tests upon specimens of wood, iron, steel, brick, stone, cement, boiler-plate, etc. In hydraulics, water-meters are calibrated, and measurements of water made by orifices and weirs.

Subjects.

I. Mechanical Drawing.—Elementary principles, use of tools, inking in, geometrical drawing. *Winter and Spring terms, Freshman year;* 2 *periods of* 2 *hours each per week. Required for a degree in Engineering courses.*

II. Mechanical Drawing.—Screw threads, bolts, and nuts, shade lines, line shading. *Fall term, Sophomore year;* 3 *periods of* 2 *hours each per week. Required for a degree in Engineering courses.*

III. Mechanical Drawing.—Descriptive Geometry. *Spring term, Sophomore year;* 3 *periods of* 2 *hours each per week. Required for a degree in Engineering courses.*

IV. Mechanical Drawing.—Machine details and parts, tracing, blue printing. *Winter term, Sophomore year;* 3 *periods of* 2 *hours each per week. Required for a degree in Engineering courses.*

V. Mechanical Drawing.—Elements of machine design. *Fall, Winter, and Spring terms, Junior year;* 1, 2, and 3 *exercises, respectively, for students in Mechanical Engineering. Fall term, Junior year;* 1 *exercise for students in Electrical Engineering. Required for a degree in Mechanical and Electrical Engineering.*

VI. Mechanical Drawing.—Poultry-house designs; estimates of materials and cost, principles of construction. *Elective.*

VII. Mechanical Drawing.—Farm buildings; plans, estimates, specifications. *Elective.*

VIII. Wood-Working.—Use of tools, bench-work, and carpentering. *Fall and Winter terms, Freshman year;* 1 *exercise of* 3 *hours per week. Required for a degree in Engineering courses.*

IX. Wood-Working.—Wood-Turning. *Spring term, Freshman year;* 1 *exercise of* 3 *hours per week. Required for a degree in Engineering courses.*

X. Pattern-Making.—*Winter term, Junior year;* 2 *exercises of* 3 *hours each per week. Required for a degree in Mechanical Engineering.*

XI. Shop-Work.—Forging, drawing, bending, welding, and tool dressing. *Fall term, Junior year;* 2 *exercises of* 3 *hours each per week. Required for a degree in Mechanical Engineering.*

XIII. Machine-Shop Practice.—*Winter and Spring terms, Junior year;* 2 *and* 3 *exercises per week, respectively. Fall and Winter terms, Senior year;* 3 *exercises of* 3 *hours each per week for students in Mechanical Engineering. Winter and Spring terms, Junior year;* 2 *exercises of* 3 *hours each per week for students in Electrical Engineering.*

XIV. Wood-Carving.—Care and use of tools, geometrical motives, diaper patterns, incised carving, flat and curved surface carving, historic ornament, low relief and high relief. 1 *exercise of* 3 *hours per week. Elective.*

XV. Steam Boilers.—Types, construction, strength, uses and management. *Spring term, Junior year;* 3 *exercises per week. Required for a degree in Engineering courses.*

XVI. Thermodynamics.—As directly applied to the steam engine. Simple and compound engines. *Fall term, Junior year;* 3 *exercises per week. Required for a degree in Engineering courses.*

XVII. Steam Engineering.—Valve gears, regulators, condensers, power plants, tests. *Winter term, Junior year;* 3 *exercises per week. Required for a degree in Engineering courses.*

XVII. (A) Transporting Machinery.—*Fall term, Senior year;* 3 *exercises per week. Elective.*

XVIII. Strength of Materials.—Wood, iron, steel, alloys, brick, stone, and cements. *Fall term, Senior year;* 3 *exercises and* 1 *laboratory exercise of* 2 *hours per week. Required for a degree in Mechanical Engineering.*

XIX. Theoretical and Applied Mechanics.—Bodies at rest and in motion, friction of rest and motion, energy, work, and power. *Winter and Spring terms, Senior year; 4 exercises per week. Required for a degree in Mechanical Engineering.*

XXI. Hydraulics.—Flow of water through papes, orifices, and sewers. Measurement of flow of rivers and streams. Water power and water supply. *Fall term, Senior year; 3 exercises per week. Required for a degree in Mechanical and Highway Engineering.*

XXII. Engineering Laboratory.—Physical tests of materials used in industries and in construction. Tests of machines and apparatus. *Spring term, Senior year; 2 lectures and 1 laboratory exercise per week. Required for a degree in Mechanical Engineering.*

XXIII. Mill Construction.—Lectures upon the structural development and design of shops and mills. *Winter term, Senior year; 3 exercises per week. Required for a degree in Mechanical Engineering.*

XXIII. (A) A Mill Equipment.—*Winter term, Senior year; 3 exercises per week. Elective.*

XXIV. Metallurgy.—See Chemistry XIX. *Fall term, Junior year; 3 exercises per week. Required for a degree in Engineering courses.*

XXV. Textile Machinery.—Lectures upon types of machinery and processes for the manufacture of cotton and woolen goods. *Spring term, Senior year; 3 exercises per week. Elective in Mechanical Engineering course.*

XXVI. Engineering Laboratory.—3 *exercises per week. Elective, Senior year.*

XXVII. Industrial Economics.—Management of shops, tool-room systems, Keeping of card records, contracts, and specifications, etc. *Three lectures per week. Required for a degree in Mechanical Engineering.*

Electrical Engineering.

PROFESSOR TOLMAN, MR. W. S. RODMAN.

The object of this course is to provide thorough preparation in the fundamental principles of this branch of engineering; to illustrate the application of these principles, as far as possible, in laboratory practice and by visits to electric power plants in other places.

The department is equipped with two water-tube boilers of sixty horse-power each; a fifty horse-power Armington and Simms's engine; one thirty Kilo Watt 1,000 volt single-phase alternating-current generator; one five Kilo Watt Westinghouse rotary converter; one 110 volt direct-current motor arranged with slip rings so that the machine may be used to generate single-phase or three-phase current as desired; two 110 volt direct-current generators; one 25 Kilo Watts, the other 8 Kilo Watts; one 3 Kilo Watt 110 volt direct-current motor; a storage battery of 108, 30 amper-hour cells arranged so that different voltages may be obtained for testing purposes; transformers; condensers; Hewitt, arc and incandescent lamps; Thompson and Weston measuring instruments.

A photometry room has recently been fitted up for testing and comparing different forms of illuminating apparatus.

It is believed that this equipment is well selected to give a practical course in the manipulation of apparatus used in electrical engineering at the present time.

The arrangement of motive power in the laboratory is such that determination of the efficiency of an isolated plant may be made, including engine and boilers, as well as generators, and a test of the relative economy of the use of exhaust steam from such a plant for general heating purposes.

Subjects.

I. (A) Electricity and Magnetism (Thompson).—A study of the fundamental principles of the subject. *Fall term, Junior year; 4 exercises per week for students in Electrical and Mechanical Engineering.*

I. (B) The Dynamo (Hawkins and Wallis).—The design, construction, and care of the dynamo. *Winter term, Junior year; 4 exercises per week for students in Electrical and Mechanical Engineering.*

I. (C) Direct-Current Machinery (Sheldon and Mason).—*Spring term, Junior year; 4 exercises per week for students in Electrical and Mechanical Engineering.*

II. Alternating Currents and Alternating-Current Machinery.—This subject considers the theory of generation and utilization of alternating currents; the design, construction, and operation of single-phase and poly-phase alternating-current dynamos, motors, and transformers. Sheldon and Mason's Alternating Current Machines is completed and supplemented by lectures.

The laboratory work which accompanies the subject consists of the determination of the characteristics of alternating-current circuits having various combinations of inductance and capacity; the shape of E. M. F. and current waves of different machines; measurements of self-inductance, capacity, and mutual induction; measurements of power in single-phase and poly-phase circuits; measurements of total impedance in different circuits; determination of characteristics of alternators and rotary converters; complete tests of transformers, including those of core and copper losses, regulation, and efficiency. *Throughout* *the Senior year; 4 exercises per week for students in Electrical Engineering. Other students may elect the work as a three-hour subject.*

III. Telephones.—Lectures. *Winter and Spring terms; 2 exercises per week. Elective; open to Seniors and others who have had the equivalent Junior Electrical work.*

IV. Electric Lighting (Crocker).—A complete study of the subject of electric lighting. *Fall and Winter terms; 2 exercises per week. Elective; open to students in Electrical Engineering, Senior year.*

V. Design.—Design of a lighting system including a study of location and equipment of the central station, the distributing system, and cost of installation for arc and incandescent lighting. *Winter term; 2 exercises per week. Elective; open to students in Electrical Engineering, Senior year.*

VI. Power Distribution (Bell).—A study of different methods of power distribution with especial reference to the use of electricity as motive power. *Winter and Spring terms; 2 exercises per week. Elective; open to students in Electrical Engineering, Senior year.*

Highway Engineering.

DR. HEWES.

Instruction in highway engineering is designed to equip students as practical working highway engineers. Connected as it is on the one side with work in mechanic arts, and on the other hand with the advancement of agriculture through better roads, the subject is peculiarly appropriate to this college. The interest in the road movement is increasing rapidly, and the supply of competent road engineers is not sufficient to meet even the present demand for them. This work is offered, therefore, with a good deal of confidence in its success, and recommended to young men who have the requisite scholarship to complete it, and who may develop the administrative skill necessary for road engineers.

The instruction given is essentially civil engineering adapted to highway construction. The adaptation consists partly in emphasizing throughout the work in the underlying principles of civil engineering those subjects that should enter directly into a road builder's training, such as, for instance, the geology of road materials. Then in the Senior year the students' efforts are concentrated mainly on the theory and practice of the construction, maintenance, and repair of roads in the United States. For the present the field work has been provided for by coöperation with the town of South Kingstown. It is fully recognized that the highway engineer must have a training in civil engineering, and further recognized that he must know how to *build roads.*

Subjects.

I. Surveying (Raymond).—Study of instruments, and simple surveying with the compass, level, and transit. The practice in the field includes laying out and dividing land, leveling for profiles, and simple city work. The true meridian is determined by the sun and polar star. The office work includes plotting and computing from the field notes taken in the above work, also determination of areas. *Sophomore year, Spring term; 4 exercises per week. Required of students in Electrical and Highway Engineering.*

II. Surveying.—Railroad work, including a reconnoissance, preliminary and location survey of a short line of railroad in vicinity of Kingston. A complete preliminary estimate of the cost of the line is made from the notes in the office in the winter, and finished plans drawn. Special attention is also given to surveying for street railroads and highway improvement. *Throughout the Junior year; 4 exercises per week. Required of students in Highway Engineering.*

III. (A) Masonry Structures (Baker).—This course deals with the materials of masonry, including brick, stone, lime, and cement; the theory of masonry structures, including foundations for buildings, bridges, and piers; the construction of retaining walls, culverts, bridge abutments; masonry dams and arches. The student is directed to important articles in the current literature of the subject, and laboratory work is performed at intervals, as facilities and ability of the student permit. *Winter term, Senior year; 3 exercises per week. Required of students in Highway Engineering.*

III. (B) Stereotomy (French and Ives).—This subject is designed to familiarize students with the preparation of drawings used in masonry structures, and the practical details of building stone masonry. *Fall term, Senior year; 3 exercises per week. Required of students in Highway Engineering.*

IV. (A) Graphic Statics (J. Sondericker).—The student is taught the graphical method of treating construction problems. *Fall term, Senior year; 3 exercises per week. Required of students in Highway Engineering.*

IV. (B) Bridge Construction.—Following the general study of graphic methods, application is made to the construction of bridge trusses of various types. Highway bridges of steel, wood, and stone receive particular attention. *Winter term, Senior year; 3 exercises per week. Required of students in Highway Engineering.*

V. (A) Road Building.—This is a course in practical highway work. It includes the application of engineering principles to the preliminary survey, and estimate of cost of building and rebuilding roads in town and country. The subjects of surfacing old and new roads with gravel or stone and the drainage and repair of them receive particular emphasis. The details of staking out work, placing catch-basins, curbs, culverts, etc., and the crushing and rolling of stone are discussed. The student is directed to state and government reports and required to read selected topics in the literature of the subject. *Winter term, Senior year; 3 exercises per week. Required of students in Highway Engineering.*

V. (B) Field Work.—*Spring term;* 12 *hours' credit.*

Drawing.

PROFESSOR DRAKE, MISS ELDRED.

MECHANICAL DRAWING is required for a period of three years. Students keep notebooks, in which freehand sketches are made from models; and these sketches are afterward worked up into finished drawings. The making of working drawings for some machine completes the subject. Practice in tracing and blue printing is given to all students. The drawing is designed to aid in the corresponding shop-work and not to produce professional draughtsmen.

FREEHAND DRAWING.—Freehand drawing is taught in the fall and spring terms and is required in the fall term, Freshman year. The required work comprises the study of perspective and form from models and objects. Electives are offered in cast drawing, pen drawing, painting, modeling, and the history of art. The department is well equipped with books and photographs, which are made more accessible to the student body by means of a series of small exhibitions of photographs illustrating the history of art accompanied by references to the library.

Subjects.

I. Freehand Drawing.—Outline drawing in pencil. *Fall term, Freshman year;* 1 *exercise of* 2 *hours per week for students in Agriculture and Science and* 2 *exercises for all Engineering students. Required of all candidates for a degree.* Miss Eldred.

II. Drawing in Charcoal from Still Life and the Cast.—*Spring term;* 3 *exercises of* 2 *hours per week. Elective.* Miss Eldred.

III. Drawing in Charcoal from Still Life and the Cast.—*Fall term;* 3 *exercises of* 2 *hours per week. Elective.* Miss Eldred.

IV. Modeling.—*Fall term;* 3 *exercises of* 2 *hours per week. Elective.* Miss Eldred.

V. Mechanical Drawing (For subjects in Mechanical Drawing, see Mechanical Engineering, pages 47–48). Professor Drake.

VI. Pen Drawing or Painting in Oil, Water-Color, or Pastel.—*Spring term; 3 exercises of 2 hours per week. Elective.* Miss Eldred.

VII. History of Art.—*Spring term; 2 exercises of 1 hour per week. Elective.* Miss Eldred.

Stenography and Typewriting.

MISS TILTON.

Stenography and typewriting are offered as electives. A thorough knowledge of the common English branches is required of every one taking the subjects. The Benn Pitman system of stenography and either the touch or sight system of typewriting are taught. Absolute accuracy is required from the first in both subjects, and particular attention is paid to spelling and punctuation.

Subjects.

I. Elementary.—Instruction in principles; dictation. *Throughout the year; 4 exercises per week. Elective.*

II. Advanced.—Dictation, including the following: business letters, legal documents, terms used, deeds, wills, mortgages, contracts, declarations, etc.; hints useful in office work; general dictation. *Throughout the year; 3 periods per week. Elective.*

Military Science and Tactics.

CAPTAIN COOK.

All men college students are required to attend classes in military instruction for three years, or such portion thereof as the student is in college, unless excused by reason of physical disability. Credit is given for this work, and the same regulations of attendance are in force as for other subjects.

The war department furnishes for use in this instruction cadet rifles, equipments, sabres, ordnance, and details an officer of the army to act as instructor when the number of cadets is one hundred or more. The cadets are organized this year into a battalion of two companies of infantry, and detachments are made for artillery drill. Theoretical instruction is by means of lectures and recitations. The military exercises improve the physique, inculcate habits of prompt obedience and courtesy, and have an elevating influence on the conduct of the cadets.

The organization is as follows:

M. H. Cook, Captain, Signal Corps, B. R. I. M.	Commandant.
W. N. Berry	Major.
H. L. Gardiner	Captain.
J. K. Lamond	Captain.
J. R. Ferry	1st Lieutenant and Adjutant.
J. P. Grinnell	1st Lieutenant and Quartermaster.
P. W. Slocum	1st Lieutenant.
D. R. Kellogg	1st Lieutenant.
M. S. Macomber	2nd Lieutenant.
C. L. Coggins	2nd Lieutenant.
A. J. Minor	Sergeant-Major.
A. B. Davis	Quartermaster-Sergeant.
W. S. Kendrick	1st Sergeant.
A. H. Barber	1st Sergeant.
H. R. Lewis	2nd Sergeant.
J. W. Mills	2nd Sergeant.
G. J. Schæffer	3rd Sergeant.
G. W. Spalding	3rd Sergeant.
G. W. Sheldon	4th Sergeant.
T. C. Brown	4th Sergeant.
F. K. Crandall	Corporal.
A. R. Knight	Corporal.
J. L. Doyle	Corporal.
L. G. Schermerhorn	Corporal.
T. F. Salzer	Corporal.
H. O. Gough	Corporal.
C. P. Hubbard	Corporal.
C. H. Field	Corporal.
W. R. Green	Bugler.
C. P. Hart	Bugler.

Subjects.

I. Practical Instruction, Drills, and Exercises.—Infantry drill regulations, U. S. Army. *Three exercises of 1 hour each per week throughout the year. All the commands.*

II. Recitations and Lectures in Infantry Drill, Regulations and Elements of Military Science.—*One exercise per week, entire year; Sophomores.*

III. Recitations and Lectures in Infantry Drill, Regulations and Elements of Military Science.—*One exercise per week, entire year; Freshmen.*

The Courses of Study Leading to a Degree.

Explanatory.—The Roman numeral following a subject refers to the subject number; the Arabic figures next following indicate the page of the catalogue on which the subject is described. The last Arabic figure indicates the number of hours credit for the subject. By advice of the committee on courses of study, French may be substituted for German for the language requirement. Consulting with the committee on courses of study, the student chooses his electives from the subjects described on pages 29–55.

Freshman Year.

Agriculture and Courses in Science.

Fall.		Winter.		Spring.	
English II (41)	2	English II (41)	2	English II (41)	1
German I (42)	4	German I (42)	4	German I (42)	4
Mathematics VI (45)	3	Mathematics IV (45)	4	Mathematics V (45)	4
Physics I (31)	3	Physics I (31)	3	Physics I (31)	3
Chemistry I (29)	3	Chemistry I (29)	3	Chemistry I (29)	3
Freehand Drawing I (53)	1				
Military Drill and Science	2	Military Drill and Science	2	Military drill and science	2

Courses in Engineering.

English II (41)	2	English II (41)	2	English II (41)	2
German I (42)	4	German I (42)	4	German I (42)	4
Mathematics VI (45)	3	Mathematics IV (45)	4	Mathematics V (45)	4
Chemistry I (29)	3	Chemistry I (29)	3	Chemistry I (29)	3
Mechanics VIII (48)	1	Mechanics VIII (48)	1	Mechanics IX (48)	1
Freehand Drawing I (53)	2	Mechanics I (47)	2	Mechanics I (47)	2
Military Drill and Science	2	Military Drill and Science	2	Military Drill and Science	2

Sophomore Year.

Agriculture and Courses in Science.

Fall.		Winter.		Spring.	
English III (41)	2	English III (41)	2	English III (41)	2
German II (42)	3	German III (42)	3	German III (42)	3
Chemistry II (29)	3	Chemistry II (29)	3	Chemistry IV (29)	3
Zoölogy I (B) (35)	3	Zoölogy I (B) (35)	3	Zoölogy I (B) (35)	3
Botany I (33)	3	Botany I (33)	3	Botany I (33)	3
Elective	3	Elective	3	Elective	3
Military Drill and Science	2	Military Drill and Science	2	Military Drill and Science	2

Courses in Engineering.

English III (41)	2	English III (41)	2	English III (41)	2
German II (42)	3	German III (42)	3	German III (42)	3
Chemistry II (29)	3	Chemistry II (29)	3	Physics II (31)	4
Physics II (31)	4	Physics II (31)	4	Mathematics VIII (45)	3
Mathematics VII (45)	3	Mathematics VII (A) (45)	3	Mechanics III (47)	3
Mechanics II (47)	3	Mechanics IV (47)	3	Highway Engineering I (52)	4
Military Drill and Science	2	Military Drill and Science	2	Military Drill and Science	2

Junior Year.

Agriculture.

Fall.		**Winter.**		**Spring.**	
English IV (41)	2	English IV (41)	2	English IV (41)	2
Agriculture I (A) (38)	3	Agriculture II (38)	3	Agriculture II (38)	3
Military Drill and Science	2	Military Drill and Science	2	Military Drill and Science	2
Elective	12	Elective	12	Elective	12
(At least eight hours must be chosen from subjects bearing directly on agriculture.)		(At least eight hours must be chosen from subjects bearing directly on agriculture.)		(At least eight hours must be chosen from subjects bearing directly on agriculture.)	

Biology.

English IV (41)	2	English IV (41)	2	English IV (41)	2
Biology	6	Biology	6	Biology	6
(Credit will be given for all courses in Zoölogy and Botany, and for Horticulture VI.)		(Credit will be given for all courses in Zoölogy and Botany, and for Horticulture VI.)		(Credit will be given for all courses in Zoölogy and Botany, and for Horticulture VI.)	
Military Drill and Science	2	Military Drill and Science	2	Military Drill and Science	2
Elective	9	Elective	9	Elective	

Chemistry.

English IV (41)	2	English IV (41)	2	English IV (41)	2
Chemistry V (A) (29)	3	Chemistry V (A) (29)	3	Chemistry V (A) (29)	3
Chemistry V (B) (29)	3	Chemistry V (B) (29)	3	Chemistry V (B) (29)	3
Chemistry VI (30)	4	Chemistry VI (30)	4	Chemistry VII (30)	3
Chemistry III (29)	3	Chemistry VIII (30)	2	Chemistry X (30)	1
Military Drill and Science	2	Chemistry IX (30)	3	Chemistry XI (30)	1
Elective (not a chemical subject)	3	Military Drill and Science	2	Chemistry XII (30)	3
		Elective (not a chemical subject)	3	Military Drill and Science	2
				Elective (not a chemical subject)	3

General Science.

Fall.		Winter.		Spring.	
English IV (41)	2	English IV (41)	2	English IV (41)	2
Military Drill and Science	2	Military Drill and Science	2	Military Drill and Science	2
Elective	15	Elective	15	Elective	15
(A minimum of six hours of Science must be chosen.)		(A minimum of six hours of Science must be chosen.)		(A minimum of six hours of Science must be chosen.)	

Mechanical Engineering.

English IV (41)	2	English IV (41)	2	English IV (41)	2
Mathematics VIII (45)	3	Mathematics VIII (45)	4	Mathematics IX (45)	4
Mechanics V (48)	1	Mechanics V (48)	2	Mechanics V (48)	3
Mechanics XI (48)	2	Mechanics X (48)	2	Mechanics XIII (48)	3
Mechanics XVI (48)	3	Mechanics XIII (48)	2	Mechanics XV (48)	3
Chemistry XIX (30)	3	Mechanics XVII (48)	3	Electrical Engineering I (C) (50)	4
Electrical Engineering I (A) (50)	4	Electrical Engineering I (B) (50)	4	Military Drill and Science	2
Military Drill and Science	2	Military Drill and Science	2		

Electrical Engineering.

English IV (41)	2	English IV (41)	2	English IV (41)	2
Mathematics VIII (45)	3	Mathematics VIII (45)	4	Mathematics IX (45)	4
Mechanics V (48)	1	Mechanics XIII (48)	2	Mechanics XIII (48)	2
Mechanics XIV (48)	3	Mechanics XVII (48)	3	Mechanics XV (48)	3
Chemistry XIX (30)	3	Electrical Engineering I (B) (50)	4	Electrical Engineering I (C) (50)	4
Electrical Engineering I (A) (50)	4	Electrical Engineering (51)	3	Electrical Engineering (51)	3
Electrical Engineering (51)	3	Military Drill and Science	2	Military Drill and Science	2
Military Drill and Science	2				

Highway Engineering.

English IV (41)	2	English IV (41)	2	English IV (41)	2
Mathematics VIII (45)	3	Mathematics VIII (45)	4	Mathematics IX (45)	4
Mechanics XVI (48)	3	Mechanics XVII (48)	3	Mechanics XV (48)	3
Chemistry XIX (30)	3	Chemistry IX (30)	3	Geology IV (32)	3
Highway Engineering II (52)	4	Highway Engineering II (52)	4	Highway Engineering II (52)	4
Military Drill and Science	2	Military Drill and Science	2	Military Drill and Science	2
Elective	3	Elective	3	Elective	3
		(Electrical Engineering I (B) is recommended as an elective.)		(Electrical Engineering I (C) is recommended as an elective.)	

Senior Year.

Agriculture.

Fall.	**Winter.**	**Spring.**
History V (43)............ 3	Economics I (44)......... 3	Economics I (44).......... 3
Elective..................14	Elective..................14	Elective..................14
(At least eight hours must be chosen from subjects bearing directly on Agriculture.)	(At least eight hours must be chosen from subjects bearing directly on Agriculture.)	(At least eight hours must be chosen from subjects bearing directly on Agriculture.)

Biology.

History V (43)............ 3	Economics I (44).......... 3	Economics I (44).......... 3
Biology.................. 9	Biology.................. 9	Biology.................. 9
(Credit will be given for all courses in Zoölogy and Botany, and for Horticulture VI.)	(Credit will be given for all courses in Zoölogy and Botany, and for Horticulture VI.)	(Credit will be given for all courses in Zoölogy and Botany, and for Horticulture VI.)
Elective................. 3	Elective................. 3	Elective................. 3

Chemistry.

History V (43)............ 3	Economics I (44).......... 3	Economics I (44).......... 3
Chemistry XIII (30)....... 3	Chemistry XIII (30)....... 3	Chemistry XVII (30)...... 3
Chemistry XIV (30)....... 5	Chemistry XX (A) (31).... 3	Special Chemistry......... 3
Chemistry XII (30)........ 3	Chemistry XVI or XVIII (30) 3	Chemistry XX (31)..........
Chemistry XX (31)..........	Chemistry XX (31)..........	Elective.................. 6
Chemistry XVI or XIX (30). 3	Elective.................. 3	
	(To be chosen from the following: History II, IV, French, German, Psychology.)	(To be chosen from the following: History, II, IV, French, German, Psychology, Chemistry XV.)

General Science.

History V (43)............ 3	Economics I (44).......... 3	Economics I (44).......... 3
Elective..................12	Elective..................12	Elective..................12
(A minimum of six hours of Science must be chosen.)	(A minimum of six hours of Science must be chosen.)	(A minimum of six hours of Science must be chosen.)

Mechanical Engineering.

Fall.		Winter.		Spring.	
History V (43)	3	Economics I (44)	3	Economics I (44)	3
Mechanics XIII (48)	3	Mechanics XIII (48)	3	Mechanics XIX (49)	4
Mechanics XVIII (48)	4	Mechanics XIX (49)	4	Mechanics XXII (49)	3
Mechanics XXI (49)	3	Mechanics XXIII (49)	3	Mechanics XXVII (49)	3
Elective	3	Elective	3	Elective	3
(To be chosen from the following: Mechanics XVII (A), XXVI, Electrical Engineering II, Highway Engineering.)		(To be chosen from the following: Mechanics XVIII (A), XXVI, Electrical Engineering II, Highway Engineing.)		(To be chosen from the following: Mechanics XXV, XXVI, Electrical Engineering II, Highway Engineering.)	

Electrical Engineering.

History V (43)	3	Economics I (44)	3	Economics I (44)	3
Electrical Engineering II (50)	4	Electrical Engineering II (50)	4	Electrical Engineering II (50)	4
Mechanics VI (48)	3	Mechanics XV (48)	3	Inspection Excursions	
Elective	6	Elective	6	Elective	6

Highway Engineering.

History V (43)	3	Economics I (44)	3	Economics I (44)	3
Mechanics XVIII (48)	4	Highway Engineering III (A) (52)	3	Highway Engineering V (B) (53)	12
Mechanics XXI (49)	3	Highway Engineering V (A) (52)	3		
Highway Engineering III (B) (52)	3	Highway Engineering IV (B) (52)	3		
Highway Engineering IV (A) (52)	3				

THE PREPARATORY SCHOOL.

The Preparatory School

OF THE

Rhode Island College of Agriculture and Mechanic Arts.

This school is immediately connected with the college, is under the same government, and, as far as possible, gives to its students the same facilities of library and laboratories.

The preparatory school has three lines of work:

1. The Preparatory Course.
2. The Agricultural High School.
3. The Industrial High School.

These three courses are more fully explained on this and subsequent pages.

The Preparatory Course.

The course is intended for young men and women who have not the advantages offered by a high school in their home town, and also for those who because of maturity are out of touch with the schools of their neighborhood. Pupils are prepared for the Freshman class in the college.

Entrance Requirements of the Preparatory School.

First-Year Class.

For admission to the first year in the preparatory school examinations are given in arithmetic, geography, English grammar, and United States history. The arithmetic examination covers common and decimal fractions, denominate numbers, percentage, and interest. For the examinations in English grammar and United States history students are recommended to study books of the same grade as Whitney and Lockwood's English grammar and Fiske's United States history. In English each candidate is required to answer certain questions in grammar, and to write a short composition correct in spelling, capitalization, punctuation, and paragraphing. Candidates are expected to show familiarity with the following works: Hawthorne's The Great Stone Face and the Snow Image; Tennyson's Idyls of the King; DeFoe's Robinson Crusoe; The Arabian Nights; Macaulay's Lays of Ancient Rome.

Second-Year Class.

Students wishing to enter the second-year class are examined in geography, United States history, advanced arithmetic, algebra to quadratics, and English. In 1905–1906 the English requirements will cover Shakespeare's Merchant of Venice, Macbeth, and Julius Cæsar; Addison's The Sir Roger De Coverley Papers; Scott's Ivanhoe; Eliot's Silas Marner; Lowell's The Vision of Sir Launfal; Coleridge's The Ancient Mariner.

Admission without Examination.

Any mature person who can satisfy the examining committee that he has the capacity to do the work, may enter on probation and take the examination later.

Program of Study.

First-Year Preparatory.

	Periods per week.
Algebra (Hall & Knight). To Quadratics	5
English { Review of Grammar. College Requirements in Literature. }	4
General History (Myers), entire book	3
Plant Life (Bailey's Botany)	3
Military Drill or Gymnasium	3
Mechanical Drawing or Clay Modeling, Fall and Spring. Woodcarving, Winter	1

Second-Year Preparatory.

Algebra. From Quadratics	2
Geometry (Hobbs). Plane Geometry with original demonstrations	4
English. College entrance requirements completed	3
Latin (Collar & Daniel's First Year Latin), entire book. Via Latina, twenty-five pages	5
Military Drill, or Gymnasium,	3
Carpentry[*] or Freehand Drawing, Fall and Spring. Woodcarving, Winter,	1

Diplomas.

Pupils are awarded diplomas upon completing the regular work of the preparatory school.

Correspondence relating to work in the preparatory school should be directed to M. H. Tyler, Kingston, R. I.

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[*] Students who have not completed the work in mechanical drawing take that in the place of carpentry.

The Agricultural High School.

This course is designed to occupy a position somewhat similar to that of the Manual Training High School of the city, except that it offers agriculture in place of mechanics. It aims to do for those interested in rural pursuits what the Manual Training High School does for those interested in mechanical lines. It offers to the student fitted to enter a high school an opportunity to take much of the regular work of a high-school course, combined with work in agriculture which will be of direct practical value on the farm. This course aims to put the student in the field, the barn, and the greenhouse, just as the manual-training course puts him at the bench. Classroom instruction goes hand in hand with laboratory practice, emphasizing both the how and the why of agricultural methods.

Requirements for Admission.

The requirements for admission are the same as for admission to the first year of the preparatory school (see pages 65–66). With the consent of the examining committee a mature person who has not recently attended school may, without examination, enter on probation.

Subjects of Study.

Beginning with the first year the subject entitled "The Soil and the Plant" treats of the plant; the more important characteristics of different soils, considering their physical make-up, their crop-producing power and the physical properties most essential in a fertile soil; the forms of plant-food available, and how best applied; the changes which take place in the soil; the mixing of fertilizers, and interpretation of fertilizer formulas. Much attention is given to the principles of tillage and to methods of increasing and conserving soil moisture. The subject includes simple experiments in the laboratory, tillage experiments and methods of tile drainage, together with a study of the propagation and management of plants in the greenhouse.

The spring term is given to a study of vegetable gardening, particular attention being paid to the methods employed by market gardeners. Experience is gained in the starting of plants under glass, the making and management of hotbeds, the sowing of seeds, the care and transplanting of plants, etc.

In the fall term of the second year rotations and their importance in agricultural practice, meadows, pastures, and soiling, together with the leading farm crops and their methods of management, are discussed. The subject of farm animals includes a brief study of anatomy, physiology, and hygiene, the essential points of breeding, a glance at the most prominent characteristics of a few leading breeds and practice in judging.

In the winter term the subject of farm mechanics embraces a study of the simpler laws of mechanics in use in agricultural implements, farm power, principles of draft and construction, with practice in taking down and setting up agricultural machinery, etc. The work with animals gives chief attention to the dairy, including the feeding and care of dairy cows, food requirements, composition of foods and compounding of rations, together with the care and handling of milk.

The study of fruit-growing in the spring term includes methods of propagation, planting, pruning, and caring for fruit trees and small fruits, methods of fighting insects and fungi, etc. In animal husbandry the spring term is occupied with poultry culture, including practice in incubating, brooding, care and feeding of chicks.

So far as possible the laboratory work follows the lines of instruction as laid down for the different years; but since laboratory work in agriculture must be to a great extent dependent upon the season, the work in the field does not always correspond with the work in the classroom at the time. The laboratory work includes practical experience in such subjects as tile drainage, the management of farm machinery, the tilling of land, the pruning of trees, packing of apples, grafting and making of cuttings, the preparation of insecticides and fungicides, the sowing of seeds and handling of plants under glass and in the field, the feeding, care and management of cows, the handling of milk, judging of stock, rearing of chicks and other operations of the farm.

The subject of plant life running through the first year is arranged with special reference to the needs of agricultural students. The principles studied in geometry are applied to measuring land. Business arithmetic and bookkeeping deal with the every-day business of the farmer. The subject of social problems deals with the relation of the farmer to society. The complete course of study is as follows:

Program of Study.

All subjects continue throughout the year unless otherwise stated.

First Year.

	Hrs. per week
Algebra (Hall & Knight). To Quadratics	5
English. Covers requirements for admission to first year preparatory school	4
Plant Life	3
The agricultural plant, its environment, nutrition, growth, and reproduction; text-book supplemented by reading, laboratory, and field work. Special study of rose family, clover family, grass family and weed plants; seed testing for germination and purity. Plant diseases and bacteria.	
The Soil and the Plant (Fall and Winter terms).	3
The soil: constituents; factors determining fertility; texture, underdraining and its influence on texture; tillage, its objects and methods; humus, its effects and how obtained; plant-food, essential elements, where obtained, their effect upon the plant; fertilizers and fertilizer formulas; soil moisture, capacity for and conservation. The plant: general demands, demands from the soil, demands from the air; how the plant lives; propagation.	
Vegetable Gardening (Spring term).	
Market gardening methods. Seed-sowing, transplanting, watering, making and management of hotbeds. Study of different vegetable garden crops.	
Military Drill.	
Electives.—Carpentering, Forging, Freehand Drawing, Mechanical Drawing, Stenography.	

Second Year.

FALL TERM.

	Hrs. per week.
Algebra. Quadratics	2
Geometry (Hobbs). Plane Geometry	4
General History (Myers)	3
Farm Crops	3
Rotations, advantages, dangers from neglect. Pastures, permanent, in rotation; meadows, soiling, farm crops and their management.	
Animals and their management	3
Anatomy, physiology, hygiene, breeding, judging.	
Military Drill.	
Electives.—Forging, Carpentering, Freehand Drawing, Mechanical Drawing, Stenography.	

WINTER TERM.

	Hrs. per week.
Business Arithmetic and Farm Bookkeeping	3
Geometry	4
General History	3
Farm Mechanics	3
Mechanical laws used in farm machinery, farm power, principles of draft and construction, taking down and setting up of agricultural machinery.	
Dairying	3
Feeding and care of dairy cows, food requirements, compounding of rations, care and handling of milk.	
Military Drill.	
Electives.—Forging, Carpentering, Mechanical Drawing, Stenography.	

SPRING TERM.

	Hrs. per week.
Social Problems of the Farmer	3
General History	3
English. Study of authors, with theme writing	3
Fruit-Growing	3
Orchard and small fruits, grafting plants, pruning, methods of fighting insects and fungi.	
Poultry Culture	3
Incubating, brooding, care and feeding of chicks.	
Military Drill.	
Electives.—Forging, Carpentering, Freehand Drawing, Mechanical Drawing, Stenography.	

The Industrial High School.

The college has arranged to give a series of four courses, each of two years, in the following industrial lines:

I. CARPENTRY.
II. MACHINE SHOP.
III. MECHANICAL DRAUGHTING.
IV. STEAM ENGINEERING.

These courses consist of a moderate amount of study in the preparatory school, and a large amount of practice in the college shops or draughting-room. They are planned to meet the needs of those young men who are unable to spend four years or more to complete the regular engineering course, and who need to begin their lifework early.

Requirements for Admission.

The requirements for admission are those for admission to the first year of the preparatory school (see pages 65–66). With the consent of the examining committee a mature person who has not recently attended school may, without examination, enter on probation.

Subjects of Study.

Instruction is given in English, algebra, geometry, physics, and military science.

Those who select one of the shop courses are required to take a short course in mechanical drawing, and likewise those who may enter the draughting course are to spend some time in the shops. About one-third of the time for the two years is spent in study and two-thirds in shopwork or drawing. It is expected that only those persons who have a special desire or a natural inclination for mechanics will enter these courses. Such a student, by two years of faithful work, can acquire the principles and practice of a trade and, at the end, take a place in a shop as a journeyman at good wages.

Program of Study.

All subjects continue throughout the year.

First Year.

	Hrs. per week.
Algebra (Hall & Knight)	5
English. Covers requirements for admission to first year preparatory school	4
Drawing First term; freehand, principles of projection, lettering. Second term; geometrical problems, use of instruments. Third term; machine details, tracing.	3
Shop Practice The student elects this work in carpentry, machine shop, mechanical draughting, or steam engineering.	3
Military Drill and Science	2

Second Year.

Geometry (Hobbs). Plane Geometry	4
English	3
Physics	2
Lectures	3
Shop Practice and Mechanical Drawing The student continues in the same line of manual work elected the first year.	5
Military Drill	1

EXTENSION WORK.

Extension Work

OF THE

Rhode Island College of Agriculture and Mechanic Arts.

Agriculture.

The purpose of the extension work in agriculture is to carry the help of the college to those who cannot come to it for study. Whenever necessary and possible, visits will be made to any part of the state for the purpose of identifying injurious insects or plant diseases and giving instruction in the methods of treatment. Soils will be tested for acidity, and suggestions given regarding the use of lime and fertilizers. The college is open for consultation at any time in regard to any problem of the farm, garden, or orchard.

Whenever possible, arrangements will be made for talks or demonstrations by members of the college faculty or experiment-station staff, when called for, at any agricultural meeting, or neighborhood gathering. Co-operative experiments in different parts of the state are being carried out, with a view to helping the farmer solve some of the problems which are peculiar to his own farm or his portion of the state. During the past season these extension experiments have been conducted in top-dressing grass-lands at Matunuck, and in fumigating with hydrocyanic acid gas for greenhouse pests at Newport. This season experiments will be conducted in the treatment of San José scale with lime-sulphur wash and with the kerosene-limoid mixture. Top-dressing experiments will be continued and new work in the growing of alfalfa and clover will be undertaken as far as time will permit.

Demonstrations in spraying have been conducted against the San José scale; and numerous visits have been made to farms, orchards, market gardens, and greenhouses, to identify insects and prescribe remedies and to consult with the owners in regard to a variety of agricultural questions. This work will be continued the coming year.

During last fall J. Weston Hutchins, of Michigan, a practical farmer and institute lecturer, was engaged for a series of special lectures. Twenty-six meetings were held in twenty-one different places in the state, with a total attendance of nearly one thousand people. The subjects treated were TILLAGE, FEEDING, A MAN AMONG MEN, and FARMING THAT PAYS.

Members of the faculty have prepared lectures on various subjects which they are ready to deliver at any place in the state. The lectures are free, the only charge being the traveling expenses of the speaker. A pamphlet giving list of lectures and full instructions for obtaining them has been prepared and can be had on application.

Another important phase of extension work is that of the Nature Guard, which aims to interest the young people of the schools in the things of nature and the farm. Assistance will also be given to those who desire to carry on study at home.

The Nature Guard.

The Nature Guard is an organization of young people formed for the purpose of awakening in its members a livelier interest in the things of outdoor life. Its primal object is to stimulate observation and to furnish a key to the coyly hidden secrets of nature, while underneath and behind it all is the desire to instill a love of nature and of country life.

The boys and girls in one school, or in one room, if the school is graded, form themselves into a band and elect officers, which are a Spy and a Guardian. Each band fixes its own times of meeting, and adopts its own methods of procedure. Enrolment cards, to be signed and returned, are furnished from headquarters. Printed leaflets are mailed monthly during the school-year, and monthly reports giving observations of their own are asked from the members. Designs for a neat charter to be issued to each band are being considered, and it is hoped to have copies ready at the opening of the school year of 1905–6. Each member who sends in an enrolment card will receive an appropriate lapel button, and at the end of the year a neat certificate will be forwarded to all members who have sent in reports during the year.

Application has been made to the post-office department to enter the Nature-Guard leaflets in the mails as second-class matter. A heavier paper can then be used, better results will be obtained from the half-tone work, and the leaflet can be enlarged to eight pages if need be. A teacher's leaflet will be issued before the close of the year 1904–5, summarizing the principles and motives underlying nature-study and giving the gist of present practices in teaching it in the public schools. It is hoped that as this work progresses it will be possible to have a day, toward the close of the school year or in the early fall, set aside for a Nature-Guard outing or picnic. Several schools can join in these outings, if convenient, and exercises that will make the occasion pleasant and instructive can be arranged.

Application has been made to the Washington County Agricultural Society to grant premiums to school children for seed collections and for exhibits of a few vegetables which can easily be grown, either in school gardens or on plots at home. Advice and assistance will be given, so far as time will permit, to schools wishing to do school garden work. Further notes in regard to this work will be given in leaflets and circulars sent out to Nature-Guard bands and teachers.

The following bands were enrolled during the school year of 1903–1904:

Arctic Grammar School Band, Arctic, R. I. John F. Deering, Teacher.

Bright Eyes Band, Hope, R. I. Florence Ralph, Spy; Alice O'Rouke, Guardian.

Emerson Band, Phenix, R. I. Frederick B. Tew, Spy; Eva M. Snell, Guardian.

Family Band, Peru, Maine. Mrs. M. V. Hall, Mother.

Greenwood Band, Normal Grammar School, Providence, R. I. Roy Lyon, Spy; Jessie M. Gardiner, Guardian.

Harris Avenue Band, Riverpoint, R. I. Wayne Whitman, Spy; Mabel Blissart, Guardian.

Hope Band, Providence, R. I. Cassius Williams, Spy; Sara Fletcher, Guardian.

Laurel Lake Band, Kingston, R. I. Miss Hill, Teacher.

Lookout Band, Peace Dale, R. I. Magdalene Brennan, Spy; Lucretia Brown, Guardian.

Mayflower Band, Casco, Maine. Roy Colby, Spy.

Mayflower Band, Madison, Conn. Emma Lute, Spy; Emily Kashamur, Guardian.

Myrtle Band, Lynn, Mass. Joseph Golden, Spy; Edith Howard, Guardian.

Seekers Band, Davisville, R. I. Edith M. Vaughn, Teacher.

Seekers, The, Lynn, Mass. Mrs. E. T. Chamberlin, Mother.

Star Band, Kingston, R. I. Lynwood Cook, Spy; Ralph Knight, Guardian; Mary D. Whaley, Teacher.

Sunset Band, Kenyon, R. I. Leslie W. Dawley, Spy; John A. Phillips, Guardian.

Sylvan Band, Sylvania, Pa. Neil Cameron, Spy; Hannah Luckey, Guardian.

Wide-Awake Band, Providence, R. I. George F. Mycroft, Spy; Hugh McAndrews, Guardian.

Wide-Awake Band, Riverpoint, R. I. Walter Pike, Spy; Katherine Farrel, Guardian.

Wide-Awake Band, Yantic, Conn. May Foley, Spy; Marion J. Lamb, Guardian.

Religious Organizations.

Young Men's Christian Association.

Albert Edmund Wilkinson	President.
David Raymond Kellogg, '07	Vice-President.
Clarence Elmer Brett	Secretary.
Wallace Noyes Berry, '06	Treasurer.

Young Women's Christian Union.

Marion Graham Elkins, '06	President.
Sarah Elizabeth Champlin, '05	Vice-President.
Ethel Aldrich Tucker, '07	Secretary.
Cora Edna Sisson, '07	Treasurer.

Alumni Association.

George Albert Rodman, '94 Providence, R. I.	President.
Howland Burdick, '95 The College, Kingston, R. I.	Vice-President.
George Edward Adams, '94 Experiment Station, Kingston, R. I.	Secretary-Treasurer.

Executive Committee.

G. A. Rodman, '94, G. E. Adams, '94,
Howland Burdick, '95, Ebenezer Payne, '99,
R. W. Pitkin, '02.

Students.

Seniors.

Champlin, Sarah Elizabeth, Gen. Sci	Slocums.
Dow, Victor Wells, Highway Eng	Hartland, Me.
Gilman, Jean, Highway Eng	Gilman, Me.
Harrall, Nellie Armstrong, Gen. Sci	Wakefield.

Juniors.

Berry, Wallace Noyes, El. Eng	Chatham, Mass.
Elkins, Marion Graham, Gen. Sci	Amesbury, Mass.
Harding, Lee LaPlace, Highway Eng	Lyme, Conn.
Nichols, Howard Martin, El. Eng	Kenyon.

Sophmores.

Arnold, Benjamin Howard, El. Eng	East Greenwich.
Barber, Arthur Houghton, Mech. Eng	East Greenwich.
Coggins, Calvin Lester, El. Eng	Sharon, Mass.
Ferry, Jay Russell, Highway Eng	Palmer, Mass.
Kellogg, David Raymond, Chem	New London, Conn.
Kendrick, Winfield Smith, El. Eng	South Chatham, Mass.
Keyes, Frederick George, Chem	Rochester, N. Y.
Lamond, John Kenyon, El. Eng	Usquepaugh.
Lewis, Harry Reynold, Agr	Providence.
Macomber, Miner Sanford, Chem	Hartford, Conn.
Poladian, News, Chem	Marash, Turkey.
Sisson, Cora Edna, Gen. Sci	Wickford.
Slocum, Percy Wilfred, Gen. Sci	Kingston.
Tucker, Ethel Aldrich, Gen. Sci	Kingston.

Freshmen.

Briggs, William Henry	Hope Valley.
Brown, Lester Freeman	West Kingston.
Burgess, Paul Steere	Foster.
Davis, Augustus Boss	Kingston.
Drew, Joseph Drake	Brockton, Mass.
Field, Clesson Herbert	Brockton, Mass.
Fiske, Herbert Andrew	East Providence.
Fitz, Edward Arthur	Pascoag.
Gardiner, Harold Lincoln	Wakefield.

Gardiner, Robert Franklin	Wakefield.
Gory, Edward Allen	Pascoag.
Green, William Remington	Woonsocket.
Grinnell, Jason Percival	Middletown.
Hubbard, Carl Perry	Woburn, Mass.
Long, John Joseph	Woonsocket.
Mitchell, Clovis William	Harrisville.
Smith, John Lebroc	Narragansett Pier.
Tucker, Hannah Mahala	West Kingston.

Specials.

Armitage, Joseph Bradley	Providence.
Brett, Clarence Elmer, Agr	Brockton, Mass.
Coll, Richardo, Agr	Buenos Ayres, Argentine Republic.
Gilbert, Pauline Viola	Amherst, Mass.
Jordan, Frederick William, Chem	Auburn.
Lee, Alfred Rogers, Agr	Greeword.
Leighton, Abbie Francis	Kingston.
Millard, Maud Muller	Lapier, Mich.
Pierce, Orrin Francis	South Dartmouth.
Rose, Orpha Lillie	Kingston.
Sherman, Benjamin Francis, Agr	West Kingston.
Sherman, Mary Albro	Newport.
Townsend, Adolph Lawrence, Agr	Brooklyn, N. Y.
Tucker, Ellen Capron	Kingston.
Tyler, Edwina Richardson, Art	Kingston.
Weeden, James Vaughan, Agr	Providence.
White, Frederick Pierce	Pawtucket.
Wilkinson, Albert Edmund, Agr	Dorchester, Mass.

Preparatory School.

Akers, Arthur Clerance	Charlestown.
Akers, Mary Louise	Charlestown.
Albro, Harford Harold	Providence.
Birkby, Charles Hartley	Carolina.
Brigham, Herbert Brewster	Brockton, Mass.
Briggs, Sarah Elsie	Kingston.
Browne, Mary Katharine	Providence.
Brown, Thomas Clarke, Jr	East Greenwich.
Carlson, William Louis	Brockton, Mass.
Carr, Chester Arthur	Melville Station.
Comins, Raymond Carey	Willimantic, Conn.
Corriveau, Louis, H. M. de B	Stonington, Conn.
Crossman, Samuel Sutton	Needham, Mass.
Curtice, Anna Helena	Kingston.
Dennis, Marshall LeRoy	Melville Station.

Dexter, Leon Arthur	Moosup Valley.
Doyle, John Lawrence	Providence.
Eddy, James Arthur, Jr.	North Dartmouth, Mass.
Felix, Juan Manuel	Neuvitas, Cuba.
Fitzpatrick, James	Carolina.
Fitzpatrick, Margaret	Carolina.
Gardiner, Henry Wallace	Wakefield.
Givrigian Sirabeon	Kingston.
Gough, Harry Ogden	Peace Dale.
Griffith, William Herbert	Narragansett Pier.
Grinnell, Lizzie Vera	Liberty.
Hart, Crawford Peckham	Middletown.
Hayden, Littleton Carlyle	Providence.
Kelly, John	Peace Dale.
Kenyon, Albert Green	Wyoming.
Kenyon, Amos Harris	Usquepaugh.
Kenyon, Susan Elnora	Usquepaugh.
Kingston, Susie Angelena	Carolina.
Knight, Arthur Rhodes	East Greenwich.
Knight, Richard Greene Howland	East Greenwich.
Knowles, Walter	Kingston.
Lamas, Dionisio	Guaimaro, Cuba.
Lamond, Helen Scott	Usquepaugh.
Lays, Karl Eldridge	Brockton, Mass.
Learned, Raymond Hill	Florence, Mass.
Learned, Wilfred Hill	Florence, Mass.
Lewis, George Mitchell	Kingston.
Martin, George	Cartago, Costa Rica.
Mathieu, Antonia	Alton.
McKay, Ernest Alfred	New Dorchester, Mass.
Mills, John Walter	East Greenwich.
Minor, Arthur Jacob	Rochester, N. Y.
Mugerditchyan, Berge Stephen Der	New York City.
Nickerson, Walter Epson Lee	Madison, N. Y.
Quarters, Thomas Joseph	Adamsville.
Quinn, Stephen	Wakefield.
Rawdon, Herbert Edward Carson	Providence.
Salzer, Thomas Frederick	Peace Dale.
Schæffer, George Joseph	Peace Dale.
Schermerhorn, Lyman Gibbs	Kingston.
Sheldon, George Ware	Wakefield.
Sherman, Julia Frances	West Kingston.
Sisson, Bernice Eugenia	White Rock.
Slack, Charles Gorham	Abbott Run.
Slack, Lewis	Abbott Run.
Spalding, George Wanton	Providence.
Spencer, Roger Miner	Windsor, Conn.
Suros, Reyes Obdulio	Mazanillo, Cuba.

Taylor, Walter Gray	Middletown.
Tefft, Stephen Benjamin	Hamilton.
Tefft, William Hazard	Davisville
Tucker, Hattie Taber	West Kingston.
Watson, Leon Burton	Wakefield.
Weaver, Bertha Isabel	Peace Dale.
Whipple Lucius Albert	Greenville.
White, George Arthur, Jr	East Greenwich.
Yorganjain, Martin	Wakefield.

Course in Poultry-Keeping, 1904–1905.

Bogosian, Mardiros Dard	Providence.
Clark, Eliot Gardner	Ashland, Mass.
Dodge, Herbert William	Woonsocket.
Dodge, Jean McLeuise	Woonsocket.
Eden, John Jay	Bayonne, N. Y.
Harrington, Evelyn Maude	Warren.
Kerlin, Thaddeus Leavitt	Peace Dale.
Kissick, George Edward	Bristol.
Lyons, James Francis	Peace Dale.
Myerding, Otto	Bremen, Germany.
Nylander, George W	Brookline, Mass.
Parker, Bertram Munson	Vineyard Haven, Mass.
Rice, Minnie Lee	Wilbraham, Mass.
Swan, Walter David	Bradford, Mass.
Weeden, James Vaughan	Providence.

Course in Farm Practice, 1904–1905.

Eden, John Jay	Bayonne, N. Y.
Hazard, Rowland	Peace Dale.
Hurt, Anna	Houston, Texas.
Kissick, George Edward	Bristol.
Townsend, Adolph Lawrence	Brooklyn, N. Y.
Weeden, Arthur P	Providence.

Total number of students (none counted twice) 147

Graduates.*

1894.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
Adams, George Edward Kingston.	Agr.	Assistant in charge of Field Experiments, R. I. Agr. Experiment Station.
Ammonds, George Clarence 5 Boylston Place, Boston, Mass.	Mech.	Railroad Postal Clerk, on N. Y., N. H. & H. R. R.
Arnold, Chapin Trafford Providence.	Agr.	Electrician, Office 283 Westminster St., Room 10, Providence.
Burlingame, George Washington Chepachet.	Agr.	Teacher and Poultryman.
Clark, Helen May B. L., Smith College, 1899. 12 East 70 St., N. Y. City.		Private Secretary.
Knowles, John Franklin Kingston.	Mech.	Assistant Wood-Working Dept., R. I. C. A. & M. A.
Madison, Warren Brown Mount Hermon, Mass.	Agr.	Instructor in Horticulture, Mount Hermon Boys' School.
Mathewson, Ernest Hoxsie Ph. B., Brown University, 1896. West Appomatox, Va.	Mech.	Tobacco Expert, U. S. Department of Agriculture.
Peckham, Reuben Wallace Melville Station, Newport.	Agr.	Market Gardener.
Rathbun, William Sherman Wakefield.	Agr.	Practicing Veterinary.
Rodman, George Albert Providence.	Mech.	Division Engineer's Office, N. Y., N. H. & H. R. R. Co.
Sargent, Charles Lawrence Ph. D. University of Pennsylvania, 1900. Newark, New Jersey.	Agr.	Chemist, Murphy Varnish Co.
Slocum, Samuel Watson 130 West Broad St., Westerly.	Agr.	Carpenter.
Spears, John Barden Foster Centre.	Agr.	Farmer.

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*It is earnestly desired that the graduates inform the Alumni Bureau of any permanent change of address.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
SWEET, STEPHEN ADELBERT Slocums.	Agr.	Farmer.
TUCKER, GEORGE MASON Ph. D., Göttingen, 1899. Blodgett, Missouri.	Agr.	Manager, Plant-Breeding Farm.
WILBER, ROBERT ARTHUR East Greenwich.	Mech.	Express Agent.

1895.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
ALBRO, LESTER FRANKLIN Melville Station, Newport.	Agr.	Professional Singer.
BURDICK, HOWLAND Kingston.	Agr.	Farm Superintendent, R. I. C. A. & M. A.
CLARKE, CHARLES SHERMAN Jamestown.	Mech.	Marine Engineer.
ELDRED, MABEL DEWITT Kingston.		Instructor in Drawing, R. I. C. A. & M. A.
HAMMOND, JOHN EDWARD Jamestown.	Agr.	Farmer.
OATLEY, LINCOLN NATHAN Wakefield.	Mech.	Contractor and Builder.
SCOTT, ARTHUR CURTIS Ph. D., Univ. of Wisconsin, 1902. Austin, Texas.	Mech.	Professor of Electrical Engineering, Univ. of Texas.
TEFFT, JESSE COTTRELL Jamestown.	Mech.	Purser, Newport and Jamestown Ferryboat Co.
WINSOR, BYRON EDGAR Coventry.	Mech.	Poultryman.

1896.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
BROWN, MAY (MRS. CHARLES A. WHITE). Narragansett Pier.		At home.
GREENMAN, ADELAIDE MARIA (MRS. R. WALLACE PECKHAM) Melville Station, Newport.		At home.
KENYON, ALBERT LOUIS 59 Camp St., Providence.	Mech.	Printer, Silver Spring Bleaching and Dyeing Co.
MOORE, NATHAN LEWIS CASS Venice, Florida.	Agr.	Fruit-grower.
TABOR, EDGAR FRANCIS 18 Balakalava St., Providence.	Mech.	Calico Printer, Silver Spring Bleaching and Dyeing Co.
WILLIAMS, JAMES EMERSON Summit.	Agr.	Grain Dealer and Teacher.

1897.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
Carmichael, Welcome Sands Shannock.	Sci.	In Treasurer's Office, Atlantic Mills, Providence.
Case, Herbert Edwards Brown Ph.B., Brown University, 1900. Graduate, Hartford Theological Seminary, 1904.	Mech.	Missionary, Island of Guam, U. S. A.
Grinnell, Archie Franklin 85 Ninth St., Providence.	Mech.	Draughtsman.
Hanson, Gertrude Maie Peace Dale.	Sci.	At home.
Hoxsie, Bessie Bailey (Mrs. E. F. Rueckert) 98 Melrose St., Providence.	Sci.	At home.
Kenyon, Albert Prentice Ashaway.	Mech.	Bookkeeper, Maxson & Co., Westerly.
Kenyon, Charles Franklin Shannock.	Mech.	With Silver Spring Bleaching and Dyeing Co., Providence.
Larkin, Jessie Louise 98 Beach St., Westerly.	Sci.	Stenographer.
*Marsland, Louis Herbert 193 Chestnut St., Cleveland, Ohio.	Mech.	Assistant to Resident Engineer, The Lake Shore & Michigan Southern Railway Co.
Tefft, Eliza Alice Allenton.	Sci.	Teacher, Jackson College, Jackson, Miss.
*Thomas, Irving Allenton.	Mech.	Designer of Patterns.

1898.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
Arnold, Sarah Estelle (Mrs. R. O. Brooks) Leicester, Mass.	Sci.	At home.
Barber, George Washington Shannock.	Agr.	Clerk.
Cargill, Edna Maria 255 Main St., Pawtucket.	Sci.	Stenographer, Pawtucket Institution for Savings.
*Case, John Peter	Agr.	
Clarke, William Case Wakefield.	Sci.	Secretary, Sea View Electric Railroad.
Congdon, Henry Augustus Kingston.	Mech.	Farmer.
Flagg, Martha Rebecca Hardwick, Mass.	Sci.	At home.

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*Not heard from this year.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
Harley, William Ferguson 62 Hillside Avenue, Providence	Agr.	Salesman, with Messrs. Callender, McAuslan & Troup, Providence.
Turner, Harriette Florence (Mrs. Geo. M. Tucker) Graduate, Drexel Institute, 1900, Blodgett, Missouri.	Sci.	At home.
Wilson, Grace Ellen (Mrs. W. F. Harley) 62 Hillside Avenue, Providence.	Sci.	At home.

1899.

Bosworth, Alfred Willson Storrs, Conn.	Sci.	Expert Cheese Chemist, U. S. Dept. of Agriculture.
Brooks, Ralph Ordway Leicester, Mass.	Sci.	Chemist.
George, Lillian Mabelle A. B., Univ. Ill, 1904. Kingston.	Sci.	Librarian, R. I. C. A. & M. A.
Harvey, Mildred Wayne 123 E. Seneca St., Ithaca, N. Y.	Sci.	Private Secretary.
Kenyon, Blydon Ellery Austin, Texas.	Agr.	Assistant in Physics, University of Texas.
Knowles, Carroll 155 Benefit St., Providence.	Mech.	Draughtsman, Brown & Sharpe Mfg. Co.
Knowles, Harry 155 Benefit St., Providence.	Sci.	Reporter, Providence Journal.
Ladd, Merrill Augustus Schenectady, N. Y.	Mech.	Testing Department, General Electric Co.
Morrison, Clifford Brewster 543 Broad St., Providence.	Sci.	Chemist, City Sewerage Dept.
Owen, William Frazier Schenectady, N. Y.	Mech.	Engineering Dept., General Electric Co.
Payne, Ebenezer M. D., Univ. of Michigan, 1904. Great Barrington, Mass.	Sci.	Physician.
Phillips, Walter Clarke Ph. B., Brown University, 1902. A. M., Brown University, 1903. 155 Benefit St., Providence,	Mech.	Instructor in English, Brown University.
Reynolds, Robert Spink New London, Conn.	Mech.	Draughtsman, Bridge Dept., N. Y., N. H. & H. R. R. Co.
Rice, Minnie Elizabeth Wickford.	Sci.	Teacher, Jackson College, Jackson, Miss.
Sherman, Abbie Gertrude (Mrs. Benjamin Barton) 200 Sherburne St., Providence.	Sci.	At home.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
Sherman, George Albert West Kingston.	Mech.	Insurance Agent.
Thompson, Sally Rodman (Mrs. Lewis Balch) Kingston.	Sci.	At home.

1900.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
Brightman, Henry Maxson 1409 Majestic Bldg., Detroit, Mich.	Mech.	Michigan Representative, Buffalo Forge & Blower Co.
Cross, Charles Clark 2223 N. 13th St., Philadelphia, Pa.	Mech.	With Black Diamond File Works.
Eldred, John Raleigh 194 Vinton St., Providence.	Mech.	Draughtsman, Household Sewing Machine Co.
Fison, Gertrude Sarah 784 Prospect Place, Brooklyn N. Y.	Sci.	Children's Librarian, Brooklyn Public Library, 234 Albany Ave., Brooklyn.
Fry, John Joseph East Greenwich.	Mech.	Suburban Correspondent for Providence Telegram.
Goddard, Edith Campello, Mass.	Sci.	Teacher, High School, Hopedale, Mass.
Kenyon, Amos Langworthy White Plains, N. Y.	Agr.	Dairyman, Gedney Farm.
Munro, Arthur Earle Ph B., Brown University, 1902. 18 Mitchell St., Providence.	Sci.	Student, Boston University Law School, Boston.
Soule, Ralph Nelson Wickford.	Sci.	Student, 201 E. St., N. W. Washington, D. C.
Steere, Anthony Enoch 317 E. Jefferson St., Boise, Idaho.	Mech.	Civil Engineer, U. S. Reclamation Service.
Stillman, Lenora Estelle 108 W. 115th St., N. Y. City.	Sci.	Teacher.
Tucker, Bertha Douglass Swansea Centre, Mass.	Sci.	Dressmaker.
Wheeler, Charles Noyes Narragansett Pier.	Sci.	With Providence Telephone Co.
Wilson, Joseph Robert Belleville.	Mech.	In Woolen Mills, J. P. Campbell.

1901.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
Brayton, Charles Andrew Fiskeville.	Agr.	Farmer.
Briggs, Nellie Albertine 136 Broadway, Providence.	Sci.	Stenographer, R. I. Hospital Trust Co.
Burgess, Charles Stuart 264 Sayles St., Providence.	Mech.	Draughtsman, Brown & Sharpe Mfg. Co.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
Clarner, Louis George Karl, Jr. Arnold's Mills.	Sci.	Farmer.
Dawley, Edna Ethel . . . . Kenyon.	Sci.	Teacher.
Denico, Arthur Albertus . . . Narragansett Pier.	Sci.	Electrician, 209 W. 108th St., N. Y. City.
*James, Ruth Hortense (Mrs. Herbert E. Rouse) . . .	Sci.	
Sherman, Anna Brown . . . . 122 Fountain St., Providence.	Sci.	Stenographer, with Harness & Saddlery Co., Washington St.
Sherman, Elizabeth Agnes . . 285 Chestnut Avenue, Jamaica Plains, Mass.	Sci.	Stenographer, with B. T. Sturtevant Co.
Smith, Howard Dexter . . . A. M., Brown University, 1904. Tufts College, Mass.	Sci.	Instructor in Chemistry, Tufts College.
Steere, Roena Hoxsie . . . . 98 Fifield St., Providence.	Sci.	Stenographer, with Anthony & Cowell Co.
Wilby, John . . . . Central, Missouri.	Sci.	Supply Clerk, Central Lead Co.

1902.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
Clarke, Latham . . . . . . A. M., Brown University, 1903. Boylston Hall, Cambridge, Mass.	Chem.	Graduate Student and Assistant in Chemistry, Harvard University.
Ferry, Oliver Needham . . . 8 Armington Ave., Providence.	Mech.	Draughtsman, D & W. Fuse Co.
Maxson, Ralph Nelson . . . . Kent Chemical Laboratory, New Haven, Connecticut.	Chem.	Graduate Student, Yale University.
Pitkin, Robert William . . . Rockville, Conn, R. F. D. No. 1.	Mech.	Farmer.

1903.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
Barber, Kate Grace . . . 136 Division St., New Haven, Conn.	Gen. Sci.	Student Assistant, Conn. Exp. Station.
Conant, Walter Aiken . . . . Omaha, Neb.	Agr.	Alamito Sanitary Dairy Co.
Goddard, Warren . . . . . Campello, Mass.	Mech.	Student, New Church Theological School, Cambridge, Mass.
Keefer, Edith Cecelia . . . . 832 East Grand Avenue, Des Moines, Iowa.	Biol.	Teacher of Science.

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*Deceased.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
KENT, RAYMOND WARREN . . . A. M., Harvard University, 1904. 32 Irving St., Cambridge, Mass.	Chem.	Graduate Student, Harvard University.
TEFFT, ERNEST ALLEN . . . 133 Fountain St., Providence.	El. Eng.	Electrician.

1904.

BALLOU, WILLARD ALGER . . . New London, N. H.	Biol.	Instructor in Natural Science, Colby Academy.
QUINN, MARY LOUISE . . . . Mason City, Iowa.	Biol.	Teacher of Science, High School.
RODMAN, WALTER SHELDON . . Kingston.	El. Eng.	Instructor in Physics and Electrical Engineering, R. I. C. A. & M. A.

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